Nuclear weapons

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Nuclear weapons are explosive devices that derive their destructive force from nuclear reactions, either fission or a combination of fission and fusion. Both reactions release vast quantities of energy from relatively small amounts of matter.

The paradox of nuclear weapons is that the most powerful weapons ever created have no practical value as actual weapons of war, since there can be no winner in a war that kills everybody. ~ Medea Benjamin

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A

- President Bush seeks to wage war against Iraq and Iran because they strive to obtain weapons of mass destruction. However, he does not see the weapons being stockpiled in the Israeli arsenal... He also does not see [the WMD] in Chinese, Russian, and Indian arsenals...
  - Abd Al-Bari 'Atwan, *A Rash and Vulgar President*, Al-Quds Al-Arabi (February 1, 2002)
- What is the only provocation that could bring about the use of nuclear weapons? Nuclear weapons. What is the priority target for nuclear weapons? Nuclear weapons. What is the only established defense against nuclear weapons? Nuclear weapons. How do we prevent the use of nuclear weapons? By threatening the use of nuclear weapons. And we can't get rid of nuclear weapons, because of nuclear weapons. The intransigence, it seems, is a function of the weapons themselves.
  - Martin Amis, *Einstein's Monsters* (1987), "Introduction: Thinkability".
- The arms race is a race between nuclear weapons and ourselves.
  - Martin Amis, *Einstein's Monsters* (1987), "Introduction: Thinkability".

- They have things like the atom bomb! So, I'll think I'll stay where I *am*. Civilization? I'll stay right here!
  - The Andrews Sisters and Danny Kaye, "Civilization (Bongo, Bongo, Bongo)" (http://www.songlyrics.com/the-andrews-sisters/civilization-bongo-bongo-bongo-lyrics/) (1947), Decca
- The idea that every nation ought to have an atomic bomb, like every woman of fashion ought to have a mink coat, is deplorable.
  - Clement Attlee, cited in S. Beer, *Modern British Politics*,(Faber and Faber, 1965) and Stuart Thompson,*The Dictionary of Labour Quotations*, Biteback Publishing, (2013).
- The Obama Administration must move more quickly to plan for a future in which nuclear weapons are likely to play a greater role in national defense. Hard as it may be to accept, Dr. Strangelove is back.
  - Michael Auslin "The Dangerous Degradation Of The U.S. Nuclear Arsenal" (https://www.forbes.com/sites/realspin/2014/02/27/the-dangerous-degradation-of-the-u-s-nuclear-arsenal/) *Forbes* (February 27, 2014).

Every man, woman and child lives under a nuclear sword of Damocles, hanging by the slenderest of threads, capable of being cut at any moment by accident, or miscalculation, or by madness. ~ John F. Kennedy

B

- Now we're all sons-of-bitches.
  - Kenneth Bainbridge remark to Robert Oppenheimer immediately after the first atom bomb test explosion at Alamogordo as quoted in Lansing Lamont, *Day of Trinity* (1966), p. 242.
- On May 28, 1998, Pakistan conducted five simultaneous underground nuclear test at Ras Koh Hills in the Chagai District of Balochistan against the Baloch citizen's will and mandate, a crime against humanity and against all international laws.
  - Balochistan National Congress, as qtd. in "Baloch activists condemn Pak's 1998 nuclear tests" (https://www.vietnamtribune.com/news/257370168/baloch-activists-condemn-pak-1998-nuclear-tests), ANI, *Vietnam Tribune*, (29 May 2018).
- Pakistan began building nuclear weapons in the early 1970s, when India became the sole nuclear power in South Asia. Prime Minister Zulfiqar Ali Bhutto, in power in Pakistan at the time, famously said"Ham ghaas kahe ge, mager bomb banahe ge" — "We will eat grass later, but we will make a bomb."
  Shortly before the 1998 tests, the Pakistani government announced that it had chosen a deserted area in Chagai district to conduct them. But in his 2014 Master's thesis, titled "Impacts of Nuclear Tests on Chagai," Abdul Raziq reveals that the area was actually a village and was not deserted. He writes that the blasts took place on one mountain in the Ras Koh mountain range (Koh-E-Kamran), in the village of Chehtar in Chagai district. While the government claimed that there were "only ten households near to the site, who were shifted to a safer place," Raziq reports that there were many households near the site, and that even if the tests were conducted one kilometer from the ten households the government says were moved, it would not have kept them safe. "Four thousand people were affected from the blasts," he writes. "Even the government did not facilitate the people who were displaced and dislocated."

Open up a new chapter with the Cuban people, shut down Iran's nuclear weapons program without firing a shot, take out the mastermind of 9/11. ~ Barack Obama

- Shah Meer Baloch, "The Fallout From Pakistan's Nuclear Tests" (https://thediplomat.com/2017/05/the-fallout-from-pakistans-nuclear-tests/), *The Diplomat*, (May 29, 2017).

President Bush seeks to wage war against Iraq and Iran because they strive to obtain weapons of mass destruction. However, he does not see the weapons being stockpiled in the Israeli arsenal... He also does not see [the WMD] in Chinese, Russian, and Indian arsenals... ~ Abd Al-Bari 'Atwan

- Countries keep most details of their nuclear weapons secret, but it is known that nine countries own the estimated more than 9,000 nuclear weapons that are in military service. These are either deployed - mounted on land or sea missiles and kept at air bases - or in storage. About 1800 are on high alert and could be fired with little warning.
  The US and Russia own the vast majority of the world's nuclear weapons.
  Including retired warheads waiting to be dismantled, the total is said to be almost 15,000, according to the Stockholm International Peace Research Institute (Sipri). This is a marked decline since the 1980s when the figure peaked at around 70,000.
  - *BBC News*, "Reality Check: Where are the world's nuclear weapons?" (https://www.bbc.com/news/world-42873633), Reality Check, (2 February 2018).

- People in several Chinese border cities reported feeling the tremors from the seismic activity at the time of the test.
  School children ran out into the open in the city of Yanji, which is 10km (6.25 miles) from the border, when they felt the shaking, Global Times reported.
  Very close to the site is Punngye-ri village and about 80km away is the North Korean city of Chongjin, but it is not known if these towns were evacuated or warned in any way.
  - *BBC*, "Punggye-ri: What we know about North Korea's nuclear test site" (https://www.bbc.com/news/world-asia-41144315), (29 April 2018).

I am become death, The Shatterer of Worlds. ~ Bhagavad Gita

- A war with Russia or China would risk escalating into World War III. As Andrew Weiss told the Times on Ukraine, Russia and China would have conventional "escalation dominance," as well as simply more at stake in wars on their own borders than the United States does. So what would the United States do if it were losing a major war with Russia or China? U.S. nuclear weapons policy has always kept a "first strike" option open in case of precisely this scenario. **The current U.S. $1.7 trillion plan for a whole range of new nuclear weapons therefore seems to be a response to the reality that the United States cannot expect to defeat Russia and China in conventional wars on their own borders.** But the paradox of nuclear weapons is that the most powerful weapons ever created have no practical value as actual weapons of war, since there can be no winner in a war that kills everybody. Any use of nuclear weapons would quickly trigger a massive use of them by one side or the other, and the war would soon be over for all of us. The only winners would be a few species of radiation-resistant insects
  - Medea Benjamin and Nicolas J. S. Davies, in The High Stakes of the U.S.-Russia Confrontation Over Ukraine, *Common Dreams* (https://www.commondreams.org/views/2021/11/22/high-stakes-us-russia-confrontation-over-ukraine), November 22, 2021
- As the Director of the Theoretical Division of Los Alamos, I participated at the most senior level in the World War II Manhattan Project that produced the first atomic weapons.
  Now, at age 88, I am one of the few remaining such senior persons alive. Looking back at the half century since that time, I feel the most intense relief that these weapons have not been used since World War II, mixed with the horror that tens of thousands of such weapons have been built since that time—one hundred times more than any of us at Los Alamos could ever have imagined.
  Today we are rightly in an era of disarmament and dismantlement of nuclear weapons. But in some countries nuclear weapons development still continues. Whether and when the various Nations of the World can agree to stop this is uncertain. But individual scientists can still influence this process by withholding their skills.

Accordingly, I call on all scientists in all countries to cease and desist from work creating, developing, improving and manufacturing further nuclear weapons - and, for that matter, other weapons of potential mass destruction such as chemical and biological weapons.

  - Hans Albrecht Bethe On the 50th anniversary of Hiroshima in letter, *Bulletin of the Atomic Scientists* (Nov 1995), 51:6, p. 3.

- There are clear and predictable consequences for the world if human beings continue to rape the earth and plunder its resources; to exploit, oppress, and dominate the weak and the poor for the sake of greed and the hunger for power; to depend on ever-rising levels of violence and ever more lethal instruments of death and destruction in order to secure positions of power and privilege.

  - Allan Boesak, *Comfort and Protest* (1987), pp. 65-66

- The House should express its opposition to the escalation of the nuclear arms race by any nation and, in particular, its opposition to Canada's participation by testing in Canada any nuclear weapon or nuclear weapon delivery vehicle such as, and including, the cruise missile.

  - Edward Broadbent, Canadian House of Commons speech, (July 1, 1983); as qtd in John Clearwater, ""Just Dummies": Cruise Missile Testing in Canada" (https://books.google.com/books/about/Just_Dummies.html?id=x1dL_4n8QcYC&printsec=frontcover&source=kp_read_button#v=onepage&q&f=false), (2005), p.52.

- We will be making a sufficient but necessary contribution if we simply jar the prevalent complacency on the doctrine of shoot-from-the-hip-and-empty-the-magazine.

  - Bernard Brodie, remarking on the prevalent 1950's strategy of massive retaliation, colloquially know as the 'Sunday Punch'. (Cited from a semi-classified RAND document, *Must We shoot From the Hip?*)

- We may as well admit that the strictly tactical problem of destroying Manhattan is already absurdly easy, and time promises to make it no less easy. That is only to say that its protection, if it can be protected, is henceforward a strategic and political problem rather than a tactical one.

  - Bernard Brodie , "Strategy in the Missile Age" (1959), [1] (http://www.rand.org/pubs/commercial_books/CB137-1.html)

- On the eve of the Arab-Israeli war, 50 years ago this week, Israeli officials raced to assemble an atomic device and developed a plan to detonate it atop a mountain in the Sinai Peninsula as a warning to Egyptian and other Arab forces, according to an interview with a key organizer of the effort that will be published Monday.
  The secret contingency plan, called a “doomsday operation” by Itzhak Yaakov, the retired brigadier general who described it in the interview, would have been invoked if Israel feared it was going to lose the 1967 conflict. The demonstration blast, Israeli officials believed, would intimidate Egypt and surrounding Arab states — Syria, Iraq and Jordan — into backing off.
  Israel won the war so quickly that the atomic device was never moved to Sinai. But Mr. Yaakov’s account, which sheds new light on a clash that shaped the contours of the modern Middle East conflict, reveals Israel’s early consideration of how it might use its nuclear arsenal to preserve itself.
  “It’s the last secret of the 1967 war,” said Avner Cohen, a leading scholar of Israel’s nuclear history who conducted many interviews with the retired general.

The Lop Nur project is just the tip of an international iceberg, remarks Abel Gonzalez of the Argentine Nuclear Regulatory Authority in Buenos Aires. Radiation researchers have had easy access to only three sites where nuclear blasts occurred—the U.S.’s site Bikini Atoll, the Soviet Union’s Semipalatinsk site in Kazakhstan and France’s site in Polynesia—and these areas represent just a small fraction of the approximately 500 atmospheric tests the world has seen. “We have a moral responsibility to investigate all nuclear test sites,” Gonzalez says. Certainly for the Xinjiang people affected by the Lop Nur tests, truer words have never been spoken. ~ Zeeya Merali

- Broad, William J.; Sanger, David E, "'Last Secret' of 1967 War: Israel's Doomsday Plan for Nuclear Display" (https://www.nytimes.com/2017/06/03/world/middleeast/1967-arab-israeli-war-nuclear-warning.html), *New York Times*, (June 3, 2017).

- If the Israeli leadership had detonated the atomic device, it would have been the first nuclear explosion used for military purposes since the United States' attacks on Hiroshima and Nagasaki 22 years earlier. The plan had a precedent: The United States considered the same thing during the Manhattan Project, as the program's scientists hotly debatedwhether to set off a blast near Japan in an effort to scare Emperor Hirohito into a quick surrender. The military vetoed the idea, convinced that it would not be enough to end the war.

  - Broad, William J.; Sanger, David E, "'Last Secret' of 1967 War: Israel's Doomsday Plan for Nuclear Display" (https://www.nytimes.com/2017/06/03/world/middleeast/1967-arab-israeli-war-nuclear-warning.html), *New York Times*, (June 3, 2017).

A weapon is something with which you try to affect the purposes and the concepts of an opponent; it is not something with which you blindly destroy his entire civilization, and probably your own as well. ~ George F. Kennan

- Punggye-ri is located in the remote, mountainous northeastern section of the country. The test site is believed to have been established in the early 2000s, and it became widely known following the North's first nuclear test in 2006. The smattering of journalists from the U.S., U.K., South Korea, China and Russia took a reported 20-hour journey by train and bus from Wonsan, on North Korea's east coast, to get to Punggye-ri for the nuclear site dismantlement.
  In addition to being remote, experts say Punggye-ri is an ideal test site. "From a geologic perspective, it's a really good choice," says Frank Pabian, an imagery analyst at 38 North with a long background in studying nuclear testing. Most of the test tunnels lie under Mount Mantap, a granite mountain that is perfect for containing powerful nuclear explosions.

  - Geoff Brumfiel, Elise Hu, "North Korea Demolishes Its Nuclear Test Site In A 'Huge Explosion'" (https://www.npr.org/sections/parallels/2018/05/24/613465473/north-korea-demolishes-its-nuclear-test-site-in-a-huge-explosion), (May 24, 20186).

C

- The American, English and French newspapers are spewing out elegant dissertations on the atomic bomb. We can sum it up in a single phrase: mechanized civilization has just achieved the last degree of savagery.

  - Albert Camus, *Combat*, 8th August 1945. Quoted in *In a Dark Time* Nicholas Humphrey, Robert Jay Lifton, 1984, (p.27).

- In April 1946, the sleepy town of Sarov with a population of 3000 (best known for its monastery), 400 km east of Moscow, was converted into the super-secret atomic weapons city of Arzamas-16 (sometimes nick-named "Los Arzamas"). For over 45 years Sarov disappeared from the map, to reappear under its original name of Sarov after the collapse of the Soviet Union. Throughout this 45 year period it was headed by one man: Yuli Khariton, Scientific Director of Arzamas-16 from 1946 to 1992.

  - Sublette, Carey. "The Soviet Nuclear Weapons Program" (http://nuclearweaponarchive.org/Russia/Sovwpnprog.html), nuclearweaponarchive.org. (Retrieved 21 April 2017).

- May there not be methods of using explosive energy incomparably more intense than anything heretofore discovered? Might not a bomb no bigger than an orange be found to possess a secret power to destroy a whole block of buildings—nay, to concentrate the force of a thousand

tons of cordite and blast a township at a stroke? Could not explosives even of the existing type be guided automatically in flying machines by wireless or other rays, without a human pilot, in ceaseless procession upon a hostile city, arsenal, camp or dockyard?

  - Winston Churchill, "Shall We All Commit Suicide?" *Pall Mall* (Sep 1924). Reprinted in Thoughts and Adventures (1932), 250.

- Be careful above all things not to let go of the atomic weapon until you are sure, and more than sure, that other means of preserving peace are in your hands.

  - Winston Churchill, Final Speech to US Congress, as cited in *The War That Must Never Be Fought: Dilemmas of Nuclear Deterrence*

- The atomic bomb is the Second Coming in Wrath.

  - Winston Churchill, on hearing about the Trinity test, as recollected in Harvey H. Bundy, "Remembered Words," *The Atlantic* (March 1957).

- It is arguable whether the human race have been gainers by the march of science beyond the steam engine. Electricity opens a field of infinite conveniences to ever greater numbers, but they may well have to pay dearly for them. But anyhow in my thought I stop short of the internal combustion engine which has made the world so much smaller. Still more must we fear the consequences of entrusting a human race so little different from their predecessors of the so-called barbarous ages such awful agencies as the atomic bomb. Give me the horse.

  - Winston Churchill, address to the Royal College of Surgeons (10 Jul 1951). Collected in *Stemming the Tide: Speeches 1951 and 1952* (1953), p. 91.

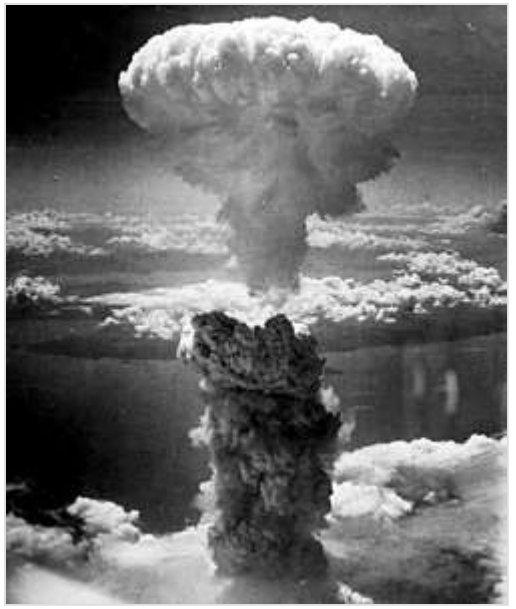
- On 17th July there came to us at Potsdam the eagerly-awaited news of the trial of the atomic bomb in the [New] Mexican desert. Success beyond all dreams crowded this sombre, magnificent venture of our American allies. The detailed reports... could leave no doubt in the minds of the very few who were informed, that we were in the presence of a new factor in human affairs, and possessed of powers which were irresistible.

  - Winston Churchill from his final review of the war and his first major speech as Leader of the Opposition in the House of Commons (16 Aug 1945). In Robert Rhodes James, ed., *Winston S. Churchill: His Complete Speeches*, 1897-1963 (1974), Vol. 1, 7210

- The divisions in the world are so great, the tensions inherent in these divisions so intense, that they have within them the seeds of a Third World War. That war would be nuclear, and would destroy all life on this planet. But that war will not take place. Maitreya knows that humanity will accept the principle of sharing, if only because we have no alternative. Every other method has been tried and has failed, and has led inevitably to separation, misery, and war. We can no longer afford the luxury of another major war. (Introduction p. 12)

  - Benjamin Creme, *Maitreya's Mission Vol. III* (1997)

- So many nations today possess the nuclear bomb, the most destructive weapon ever conceived and built, that a future major war would be the ultimate horror: the complete destruction of life on planet Earth. For many millions of years Earth would be a dead planet, a toxic waste. Men, themselves, would have to incarnate on some dark, far-off world, and begin again the long, long journey into the light.



There are clear and predictable consequences for the world if human beings continue to rape the earth and plunder its resources; to exploit, oppress, and dominate the weak and the poor for the sake of greed and the hunger for power; to depend on ever-rising levels of violence and ever more lethal instruments of death and destruction in order to secure positions of power and privilege. ~ Allan Boesak

- Benjamin Creme in *The blasphemy of war, Share International,* (https://www.share-international.org/master/2018/ma-2018_06.htm) (September 2009)

...A Third World War...would be nuclear, and would destroy all life on this planet... We can no longer afford the luxury of another major war. ~ Benjamin Creme

D

- The historical record of terrorists pursuing nuclear and radiological capabilities is small in size, complicated by significant information gaps, and not well understood. The size of the dataset and the considerable unknowns about the cases where groups have sought these capabilities make it difficult to assess the nature of the danger and to anticipate new developments in the nature of the threat. However, given the potential consequences of terrorist theft of a nuclear weapon or indigenous development of a nuclear device—even one employing a crude design that produces only a small nuclear yield—poses a serious danger that the United States and other allied nations must take extraordinary measures to thwart. Developing an effective and comprehensive strategy to prevent terrorist acquisition of nuclear and radiological weapons capabilities must begin with a thorough understanding of the historical record of terrorist efforts and opportunities to acquire these capabilities.
  - Sara Daly, John Parachini, William Rosenau, “Aum Shinrikyo, Al Qaeda, and the Kinshasa Reactor Implications of Three Case Studies for Combating Nuclear Terrorism” (https://www.rand.org/content/dam/rand/pubs/documented_briefings/2005/RAND_DB458.pdf), *Rand Project Airforce*, (2005), p. iii.
- France's past as a prolific nuclear weapons tester returned to haunt it today as a military report appeared to prove that soldiers had been deliberately exposed to the radioactive fallout of explosions in the Sahara desert.
  The French government, which carried out more than 200 tests of its nuclear weapons arsenal from 1960 to 1996, has always claimed the operations were carried out as safely as possible.
  - Lizzy Davies, "France Soldiers Exposed Nuclear Radiation" (https://www.theguardian.com/world/2010/feb/16/france-soldiers-exposed-nuclear-radiation), *The Guardian*, (16 Feb 2010).
- Do not be so naive. With economic conditions the way they are in Russia today, anyone with enough money can buy a nuclear bob. It's no big deal really.
  - Vladimir K. Dmitriev, as quoted in Pete Earley, "Comrade J: The Untold Secrets of Russia's Master Spy in America After the End of the Cold War" (https://books.google.com/books?id=TxxynN0KTJcC)
- As previous work has pointed out, the nuking of a sufficiently large city would be enough to generate a global-scale nuclear autumn. Take Los Angeles, for example, a city that extends for 500 square miles. The explosion and resulting fires would send an estimated 5.5 million tons of ash and soot into the stratosphere, causing sunlight, temperatures, and rainfall to temporarily decrease around the world. Globally, this would result in diminished growing seasons for the next half-decade, and temperatures would be the lowest in a thousand years. In some parts of the world, rainfall would be down by as much as 80 percent.
  But unlike this earlier work, which focused on relatively small, 15-kiloton nukes exploding over cities, the new study looked at whether today’s more powerful weapons could trigger nuclear autumn all on their own. They can. Liska and his colleagues found that the US, Russia, and China all have weapons that could trigger a nuclear autumn through the detonation of fewer than five bombs.

- George Dvorsky, "'Limited' Nuclear Strikes Could Still Wreak Climate Havoc" (https://gizmodo.com/limited-nuclear-strikes-could-still-wreak-climate-hav-1796931266), *Gizmodo*, (7/14/17).

E

- Some recent work by E. Fermi and L. Szilard, which has been communicated to me in manuscript, leads me to expect that the element uranium may be turned into a new and important source of energy in the immediate future. Certain aspects of the situation seem to call for watchfulness and, if necessary, quick action on the part of the Administration...

  This new phenomenon would also lead to the construction of bombs, and it is conceivable—though much less certain—that extremely powerful bombs of a new type may thus be constructed. A single bomb of this type, carried by boat or exploded in a port, might very well destroy the whole port together with some of the surrounding territory. However, such bombs might very well prove to be too heavy for transportation by air.

  - Albert Einstein, letter to President Franklin D. Roosevelt (August 2, 1939, delivered October 11, 1939); reported in *Einstein on Peace*, ed. Otto Nathan and Heinz Norden (1960, reprinted 1981), pp. 294–95.

- The release of atomic energy has not created a new problem. It has merely made more urgent the necessity of solving an existing one.

  - Albert Einstein, Statement on the Atomic Bomb to Raymond Swing, before 1 October 1945, as reported in *Atlantic Monthly*, vol. 176, no. 5 (November 1945), in *Einstein on Politics*, p. 373

- Today the atomic bomb has altered profoundly the nature of the world as we know it, and the human race consequently finds itself in a new habitat to which it must adapt its thinking.

  - Albert Einstein, "Only Then Shall We Find Courage", *New York Times Magazine* (23 June 1946).

- Nuclear proliferation is on the rise. Equipment, material and training were once largely inaccessible. Today, however, there is a sophisticated worldwide network that can deliver systems for producing material usable in weapons. The demand clearly exists: countries remain interested in the illicit acquisition of weapons of mass destruction.
  If we sit idly by, this trend will continue. Countries that perceive themselves to be vulnerable can be expected to try to redress that vulnerability — and in some cases they will pursue clandestine weapons programs. The supply network will grow, making it easier to acquire nuclear weapon expertise and materials. Eventually, inevitably, terrorists will gain access to such materials and technology, if not actual weapons.
  If the world does not change course, we risk self-destruction.

  - Mohamed ElBaradei, *Saving Ourselves From Self-Destruction* (2004), Op-Ed essay (http://www.iaea.org/NewsCenter/Statements/2004/ebNYT20040212.html) published in *The New York Times* (12 February 2004).

The atomic bomb had dwarfed the international issues to complete insignificance... the only way to end war was to have but one government for mankind. ~ Herbert George Wells

They have things like the atom bomb, so I'll think I'll stay where I am. Civilization? I'll stay right here! ~ The Andrews Sisters and Danny Kaye

F

- The modernization and expansion of nuclear arsenals in multiple countries, combined with the lack of diplomatic efforts to reduce nuclear risks, have increased the likelihood of catastrophe. Development of hypersonic glide vehicles, ballistic missile defenses, and weapons-delivery systems that can use conventional or nuclear warheads raise the probability of miscalculation during a crisis. By our estimation, the potential for the world to stumble into nuclear war—an ever-present danger over the last 75 years—increased in 2020.
  - Steve Fetter as quoted by Gayle Spinazze in, "Press Release—THIS IS YOUR COVID-19 WAKE-UP CALL: IT IS 100 SECONDS TO MIDNIGHT" (https://thebulletin.org/2021/01/press-release-this-is-your-covid-19-wake-up-call-it-is-100-seconds-to-midnight/), (January 27, 2021)
- We scientists are clever—too clever—are you not satisfied? Is four square miles in one bomb not enough? Men are still thinking. Just tell us how big you want it!
  - Richard P. Feynman as quoted in James Gleick, *Genius: The Life and Science of Richard Feynman* (1992), 204.
- Bikini islanders and their descendants have lived in exile since they were moved for the first weapons tests in 1946. When US government scientists declared Bikini safe for resettlement some residents were allowed to return in the early 1970s. But they were removed again in 1978 after ingesting high levels of radiation from eating foods grown on the former nuclear test site.
  - Agence France-Presse in Majuro, "Bikini Atoll nuclear test: 60 years later and islands still unliveable" (https://www.theguardian.com/world/2014/mar/02/bikini-atoll-nuclear-test-60-years), *The Guardian*, (1 Mar 2014).

...the danger is colossal. All nations should declare... that nuclear weapons must be destroyed. This is to save ourselves and our planet. Mikhail Gorbachev

- US nuclear experiments in the Marshall Islands ended in 1958 after 67 tests. But a United Nations report in 2012 said the effects were long-lasting. Special rapporteur Calin Georgescu, in a report to the UN human rights council, said "near-irreversible environmental contamination" had led to the loss of livelihoods and many people continued to experience "indefinite displacement".
  - Agence France-Presse in Majuro, "Bikini Atoll nuclear test: 60 years later and islands still unliveable" (https://www.theguardian.com/world/2014/mar/02/bikini-atoll-nuclear-test-60-years), *The Guardian*, (1 Mar 2014).
- Only four countries in history have surrendered their nuclear weapons. And three of those countries—Belarus, Kazakhstan, and Ukraine—did so with nuclear arms that they inherited from the defunct Soviet Union, and didn't have the wherewithal to control and maintain. (The decision to dispose of this weaponry, in exchange for support from the United States and security assurances from Russia, is still remarkable; had Ukraine and Kazakhstan kept the arsenals on their territory, they would have become the world's third- and fourth-largest nuclear powers, respectively.)
  Only South Africa has dismantled nuclear weapons that it constructed and controlled. In this sense, it is the closest analogue to what U.S. officials have in mind when they demand the "denuclearization of the Korean peninsula."
  - Uri Friedman, "Why One President Gave Up His Country's Nukes" (https://www.theatlantic.com/international/archive/2017/09/north-korea-south-africa/539265/). *The Atlantic*, (9 September 2017).

- **Uri Friedman**: Why did the South African government, in the mid-1970s, decide to embark on a nuclear-weapons program?

  F.W. de Klerk: The main motivation was the expansionist policies of the U.S.S.R. in southern Africa. They were supporting all the [African] liberation movements—they were supplying weapons and training—and it was part of their vision to gain direct or indirect control over most of the countries in southern Africa. They financed the deployment of many thousands of Cuban troops, especially to Angola, and this was interpreted as a threat first by Prime Minister John Vorster, and following upon him P.W. Botha. [The nuclear arsenal] was never intended, I think, to be used. It was a deterrent. Because of apartheid South Africa was becoming more and more isolated in the eyes of the rest of the world. There wouldn't be, in the case of Russian aggression or invasion, assistance from the international community. It was felt that, if we have nuclear weapons, and if we then would disclose in a crisis that we have [them], it would change the political scenario and the U.S.A. and other [Western] countries might step in and assist South Africa.

  - F.W. de Klerk as interviewed by Uri Friedman, "Why One President Gave Up His Country's Nukes" (https://www.theatlantic.com/international/archive/2017/09/north-korea-south-africa/539265/). *The Atlantic*, (9 September 2017).

- **Friedman**: In an op-ed in 2013 in the Los Angeles Times, you wrote, "South Africa has illustrated that long-term security can be far better assured by the abrogation of nuclear weapons than by their retention." It seems that Kim Jong Un of North Korea has, at least according to his propaganda, learned the opposite lesson: that if you're [Libya's Muammar] Qaddafi or Saddam [Hussein in Iraq] and you give up your [pursuit of] nuclear weapons, you reduce your security [and bring about your demise at the hands of the U.S. and its allies]. Or if you're Ukraine and you sign up to the Budapest Memorandum, and then Russia two decades later invades you, that you've actually given up security by relinquishing nuclear weapons.

  De Klerk: I still agree with [what I wrote]. Ultimately, the world will be safe only when all the nuclear states follow South Africa's example and dismantle their nuclear weapons.

  - F.W. de Klerk as interviewed by Uri Friedman, "Why One President Gave Up His Country's Nukes" (https://www.theatlantic.com/international/archive/2017/09/north-korea-south-africa/539265/). *The Atlantic*, (9 September 2017).

G

- There is Dimona nuclear reactor, and Israel ownership of weapon mass destruction, no one raises this issue, this is extremely dangerous. **How can the Arabs and Muslims recognize so-called Israel while it owns the nuclear arsenal? this is impossible, unless they also enjoyed the right of having their own nuclear arsenal,** there is also the refugees problem there are 4 million Palestinians who should return this is the basis of the problem.

  - Muammar Gaddafi, Talk to Al-Jazeera (September 2009) Al-Jazeera

During the next several years, in addition to the four current nuclear powers, a small but significant number of nations will have the intellectual, physical, and financial resources to produce both nuclear weapons and the means of delivering them. In time, it is estimated, many other nations will have either this capacity or other ways of obtaining nuclear warheads, even as missiles can be commercially purchased today. I ask you to stop and think for a moment what it would mean to have nuclear weapons in so many hands, in the hands of countries large and small, stable and unstable, responsible and irresponsible, scattered throughout the world. There would be no rest for anyone then, no stability, no real security, and no chance of effective disarmament. There would only be the increased chance of accidental war, and an increased necessity for the great powers to involve themselves in what otherwise would be local conflicts. If only one thermonuclear bomb were to be dropped on any American,

- I regard the employment of the atom bomb for the wholesale destruction of men, women and children as the most diabolical use of science.
  - Mohandas Gandhi, *Harijan*, 29 September 1946, quoted in *The Making of the Indian Atomic Bomb:Science, Secrecy and the Postcolonial State* by Itty Abraham, Zed Books, 1998. (p. 30).
- So far as I can see the atomic bomb has deadened the finest feeling that has sustained mankind for ages.
  - Mahatma Gandhi, (1946). In William Borman, *Gandhi and Non-Violence* (1986), 170.
- Non-violence … is the only thing that the atom bomb cannot destroy.
  - Mahatma Gandhi, in William Borman, Gandhi and Non-Violence (1986), 170.

Russian, or any other city, whether it was launched by accident or design, by a madman or by an enemy, by a large nation or by a small, from any corner of the world, that one bomb could release more destructive power on the inhabitants of that one helpless city than all the bombs dropped in the Second World War. ~ John F. Kennedy

- Decay and desolation scar the landscape of a remote corner of the Kazakh Steppe. Unnatural lakes formed by nuclear bomb explosions pockmark the once flat terrain, broken up only by empty shells of buildings. It appears uninhabitable. And yet, ghosts – living and dead – haunt the land, still burdened by the effects a nuclear testing program that stopped nearly 30 years ago.
  The site, known as the Polygon, was home to nearly a quarter of the world's nuclear tests during the Cold War. The zone was chosen for being unoccupied, but several small agricultural villages dot its perimeter. Though some residents were bussed out during the test period, most remained. The damage that continues today is visceral.
  - Alexandra Genova, "This Is What Nuclear Weapons Leave in Their Wake" (https://www.nationalgeographic.com/photography/proof/2017/10/nuclear-ghosts-kazakhstan/), *National Geographic*, (October 13, 2017).
- **As long as weapons of mass destruction exist, primarily nuclear weapons, the danger is colossal. All nations should declare... that nuclear weapons must be destroyed. This is to save ourselves and our planet.**
  - Mikhail Gorbachev in [*Mikhail Gorbachev tells the BBC: World in 'colossal danger'* (https://www.bbc.com/news/av/world-europe-50265870/mikhail-gorbachev-tells-the-bbc-world-in-colossal-danger)], BBC World News,(4 November 2019)
- As those exposed to it later told investigators, the black mist caused their eyes to sting and their skin to break out in rashes. Others vomited and suffered from diarrhea.
  It took almost three decades until the cause of the mist was acknowledged as the Totem I nuclear bomb test, as Indigenous people had been claiming for years.
  That test was one of a number conducted in the 1950s and '60s, not by the Australian government, but by its former colonial master, the UK.
  Today, 65 years after the Totem I test, the effects are still being felt in South Australia and beyond.
  - James Griffiths, "Australia is still dealing with the legacy of the UK's nuclear bomb tests, 65 years on" (https://www.cnn.com/2018/10/14/australia/australia-uk-nuclear-tests-anniversary-intl/index.html),, *CNN* (October 14, 2018).
- This weapon [the atomic bomb] has added an additional responsibility—or, better, an additional incentive—to find a sound basis for lasting peace. It provides an overwhelming inducement for the avoidance of war. It emphasizes the crisis we face in international matters and strengthens the conviction that adequate safeguards for peace must be found.
  - Leslie Richard Groves Opening address (7 Nov 1945) of Town Hall's annual lecture series, as quoted in 'Gen. Groves Warns on Atom 'Suicide'', New York Times (8 Nov 1945), 4. (Just three months before he spoke, two atom bombs dropped on Japan in Aug 1945 effectively ended WW II.)

- I first met J. Robert Oppenheimer on October 8, 1942, at Berkeley, Calif. There we discussed the theoretical research studies he was engaged in with respect to the physics of the bomb. Our discussions confirmed my previous belief that we should bring all of the widely scattered theoretical work together. … He expressed complete agreement, and it was then that the idea of the prompt establishment of a Los Alamos was conceived."
    - Leslie Richard Groves In 'Some Recollections of July 16, 1945', *Bulletin of the Atomic Scientists* (Jun 1970), 26, No. 6, 21.
- In answer to the question, "Was the development of the atomic bomb by the United States necessary?" I reply unequivocally, "Yes." To the question, "Is atomic energy a force for good or for evil?" I can only say, "As mankind wills it."
    - Leslie Richard Groves, Final statements in *And Now It Can Be Told: The Story Of The Manhattan Project* (1962), 415.
- It is only when science asks why, instead of simply describing how, that it becomes more than technology.

  When it asks why, it discovers Relativity. When it only shows how, it invents the atomic bomb, and then puts its hands over its eyes and says, "My God what have I done?"
    - Ursula Le Guin, "The Stalin in the Soul" in *The Language of the Night*, 1976.

H

- Men are the only real monsters. Godzilla's more like a nuclear weapon. A living nuclear weapon destined to walk the Earth forever. Indestructible. A victim of the modern nuclear age.
    - Makoto Hayashida, portrayed by Yosuke Natsuki in *The Return of Godzilla* (1984), directed by Koji Hashimoto
- On July 10, 1985, two bombs exploded in Auckland Harbor, New Zealand. The blasts sank the *Rainbow Warrior*, a ship owned by the international organization Greenpeace, and killed a Portuguese photographer on board. Greenpeace had been preparing the *Rainbow Warrior* to lead a protest flotilla to the French nuclear testing site at Mururoa Atoll in the South Pacific. Two months after the Auckland Harbor incident, French officials admitted their government's responsibility for destroying the *Rainbow Warrior*.
  Officials of the United States also were concerned about the *Rainbow Warrior's* presence in the Pacific: Greenpeace had protested against American missile testing in Canada less than six months earlier, and the United Stated conducts a major missile testing program at the Marshall Islands in the Pacific. The Marshall Islands tests, while not currently involving nuclear explosions, still present serious hazards for ships navigating near missile targets. Frequently, these hazards extend into ocean areas outside United States territorial waters. If a vessel like the *Rainbow Warrior* entered such waters at the time of a planned test, the United States would probably have to postpone the test - at considerable

Eighteen years ago the advent of nuclear weapons changed the course of the world as well as the war. Since that time, all mankind has been struggling to escape from the darkening prospect of mass destruction on earth. In an age when both sides have come to possess enough nuclear power to destroy the human race several times over, the world of communism and the world of free choice have been caught up in a vicious circle of conflicting ideology and interest. Each increase of tension has produced an increase of arms; each increase of arms has produced an increase of tension.
Yesterday a shaft of light cut into the darkness. Negotiations were concluded in Moscow on a treaty to ban all nuclear tests in the atmosphere, in outer space, and under water. For the first time, an agreement has been reached on bringing the forces of nuclear destruction under international control-a goal first sought in 1946 when Bernard Baruch presented a

cost - or remove the ship, an action that might violate international law. This Note addresses this potential dilemma and explores the conflict between two policies of the United States: acceptance of the international principle of freedom of the seas and use of those seas for exclusive purposes. The aggressive political activities of organizations such as Greenpeace suggest that this conflict may have more than academic import.

  - *Harvard Law Review*, "Exclusion of Ships from Nonterritorial Weapons Testing Zones" (https://www.jstor.org/stable/1341242), Vol. 99, No. 5 (Mar., 1986), pp. 1040.

- Anyone who thinks we can continue to have world wars but make them nice polite affairs by outlawing this weapon or that should meditate upon the outlawing of the cross-bow by Papal authority. Setting up the machinery for international law and order must surely precede disarmament. The Wild West did not abandon its shooting irons till after sheriffs and courts were established.

  - Joel H. Hildebrand Speech, American Library Association Conference (3 Jul 1947), as quoted by Lawrence E. Davies in "Army's Atomic Bid Viewed in Making," *New York Times* (4 Jul 1947), 11.

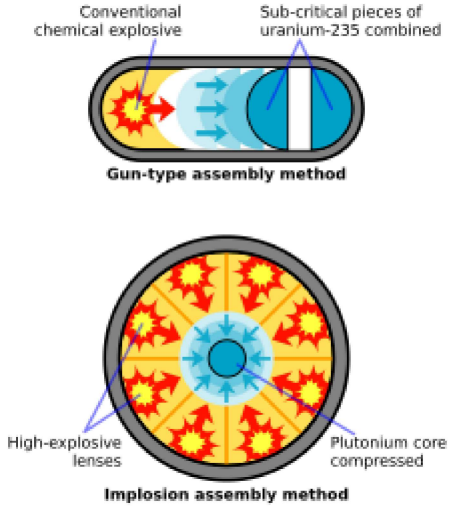
- For years after World War II, both the United States and the Soviet Union had been trying to perfect a long-range missile capable of carrying nuclear warheads. Building on the successes of Nazi Germany in developing the V-1 and V-2 rockets that pummeled Great Britain during the last months of World War II, both American and Russian scientists raced to improve the range and accuracy of such missiles. (Both nations relied heavily on captured German scientists in their efforts.) In July 1957, the United States seemed to win the race when the Atlas, an ICBM with a speed of up to 20,000 miles an hour and an effective range of 5,000 miles, was ready for testing. The test, however, was a disaster. The missile rose only about 5,000 feet into the air, tumbled, and plunged to earth. Just a month later, the Soviets claimed success by announcing that their own ICBM had been tested, had "covered a huge distance in a brief time," and "landed in the target area." No details were given in the Russian announcement and some commentators in the United States doubted that the ICBM test had been as successful as claimed. Nevertheless, the Soviet possession of this "ultimate weapon," coupled with recent successful test by the Russians of atomic and hydrogen bombs, raised concerns in America. If the Soviets did indeed perfect their ICBM, no part of the United States would be completely safe from possible atomic attack.

  - *History.com*, "Russia tests an intercontinental ballistic missile" (https://www.history.com/this-day-in-history/russia-tests-an-intercontinental-ballistic-missile).

- With regard to nuclear weapons, the situation is far more dangerous than the last Doomsday Clock report. New weapons systems under development are much more effectively dangerous. **The Biden administration, expanding upon Trump's confrontational approach, has Chomsky at a loss for words to describe the danger at hand. Only recently, Biden met with NATO leaders and instructed them to plan on two wars, China and Russia. According to Chomsky: "This is beyond insanity." Not only that, the group is carrying out provocative acts when diplomacy is really needed.** This is an extraordinarily dangerous situation.

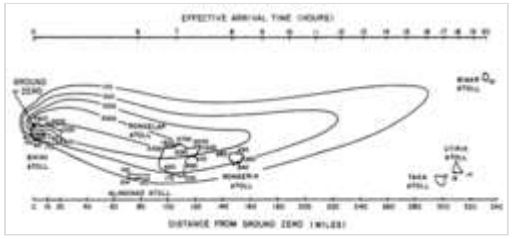
  - A World of Total Illusion and Fantasy: Noam Chomsky on the Future of the Planet, Robert Hunziker, *CounterPunch* (https://www.counterpunch.org/2021/07/12/a-world-of-total-illusion-and-fantasy-an-interview-with-noam-chomsky/) (12 July 2021)

comprehensive control plan to the United Nations. ~ John F. Kennedy



Continued unrestricted testing by the nuclear powers, joined in time by other nations which may be less adept in limiting pollution, will increasingly contaminate the air that all of us must breathe. Even then, the number of children and grandchildren with cancer in their bones, with leukemia in their blood, or with poison in their lungs might seem statistically small to some, in comparison with natural health hazards. But this is not a natural health hazard -- and it is not a statistical issue. The loss of even one human life, or the malformation of even one baby -- who may be born long after we are gone -- should be of concern to us all. Our children and grandchildren are not merely statistics toward which we can be indifferent. ~ John F. Kennedy

- **According to Chomsky, the Doomsday Clock setting at 100 seconds to midnight is based upon: (1) global warming (2) nuclear war and (3) disinformation, or the collapse of any kind of rational discourse.** As such, number three makes it impossible to deal with the first two major problems. Along those lines, within the Republican Party there's virtually a disappearance of any pretense of rational discourse. Twenty-five (25%) percent of Republicans believe the government is run by an elite satanic group of pedophiles. Seventy percent (70%) of Republicans believe that the election was stolen. Only fifteen percent (15%) of Republicans believe that global warming is a serious problem. Therein lies an insurmountable problem to solving the main issues that continually tick the clock ever closer to a disaster scenario that will likely be unprecedented in the annals of warfare and environmental degradation. As a result, Chomsky says: "We're living in a world of total illusion and fantasy." Accordingly, "Unless this is dealt with soon, it'll be impossible to deal with the two major issues within the time span that we have available, which is not very long."
    - A World of Total Illusion and Fantasy: Noam Chomsky on the Future of the Planet, Robert Hunziker, *CounterPunch* (https://www.counterpunch.org/2021/07/12/a-world-of-total-illusion-and-fantasy-an-interview-with-noam-chomsky/) (12 July 2021)
- The use of the atomic bomb with its indiscriminate killing of women and children, revolts my soul.
    - Herbert Hoover, Letter (8 Aug 1945) to Colonel John Callan O'Laughlin, publisher of Army an Navy Journal, as quoted in Gar Alperovitz, The Decision to Use the Atomic Bomb (1996), 459. Cited as O'Laughlin Correspondence File, Box 171, Post-Presidential Papers, Herbert Hoover Presidential Library.



Any military commander who is honest with himself, or with those he's speaking to, will admit that he has made mistakes in the application of military power. He's killed people unnecessarily—his own troops or other troops—through mistakes, through errors of judgment. A hundred, or thousands, or tens of thousands, maybe even a hundred thousand. But… he hasn't destroyed nations. And the conventional wisdom is *don't make the same mistake twice, learn from your mistakes*. And we all do. Maybe we make the same mistake three times, but hopefully not four or five. But there will be *no learning period* with nuclear weapons. You make one mistake and you're going to destroy nations. ~ Robert McNamara

I

- The belief of some governments that nuclear weapons are a legitimate and essential source of security is not only misguided, but also dangerous, for it incites proliferation and undermines disarmament. All nations should reject these weapons completely — before they are ever used again.
  This is a time of great global tension, when fiery rhetoric could all too easily lead us, inexorably, to unspeakable horror. The specter of nuclear conflict looms large once more. If ever there were a moment for nations to declare their unequivocal opposition to nuclear weapons, that moment is now.
    - International Campaign to Abolish Nuclear Weapons, Official statement after winning the 2017 Nobel Peace Prize (http://www.icanw.org/action/nobel-peace-prize-2017-2/)
- We applaud those nations that have already signed and ratified the Treaty on the Prohibition of Nuclear Weapons, and we urge all others to follow their lead. It offers a pathway forward at a time of alarming crisis. Disarmament is not a pipe dream, but an urgent humanitarian necessity.
    - International Campaign to Abolish Nuclear Weapons, Official statement after winning the 2017 Nobel Peace Prize (http://www.icanw.org/action/nobel-peace-prize-2017-2/)

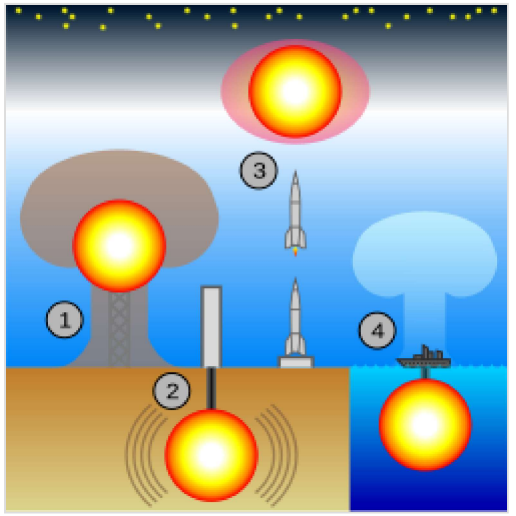
J

- **There is one question today that is more important than any other question that could possibly be asked, and it's this: Is what the U.S. and its allies are trying to accomplish in Ukraine worth continually risking nuclear armageddon for?** ...Well? Is it? It's not really a question you can just compartmentalize away from if you have integrity. It demands to be answered. Is it worth it to continue along this trajectory? Is it? Is it really? Perhaps there might be some things that would be worth risking the life of every creature on earth to obtain, but is refusing to concede to Moscow's demands in Ukraine one of them? Whatever your values are, whatever your analysis is, whatever beliefs you've been holding to justify your support for the west's side of this conflict, will you still proudly stand by them if you look outside and see a mushroom cloud growing in the distance?
    - Caitlin Johnstone: The Single Most Important Question In The World Right Now, *Consortium News* (https://consortiumnews.com/2022/03/01/caitlin-johnstone-the-single-most-important-question-in-the-world-right-now/) March 1, 2022

- Fifty years ago, on Jan. 21, 1968, the Cold War grew significantly colder. It was on this day that an American B-52G Stratofortress bomber, carrying four nuclear bombs, crashed onto the sea ice of Wolstenholme Fjord in the northwest corner of Greenland, one of the coldest places on Earth. Greenland is part of the Kingdom of Denmark, and the Danes were not pleased.
    - Timothy J. Jorgensen; "50 years ago, a U.S. military jet crashed in Greenland – with 4 nuclear bombs on board" (https://www.pbs.org/newshour/world/50-years-ago-a-us-military-jet-crashed-in-greenland-with-4-nuclear-bombs-on-board), PBS News Hours, (Jan 21, 2018).
- After the crash, the United States and Denmark had very different ideas about how to deal with HOBO 28's wreckage and radioactivity. The U.S. wanted to just let the bomber wreckage sink into the fjord and remain there, but Denmark wouldn't allow that. Denmark wanted all the wreckage gathered up immediately and moved, along with all of the radioactively contaminated ice, to the United States. Since the fate of the Thule Air Base hung in the balance, the U.S. agreed to Denmark's demands.
    - Timothy J. Jorgensen; "50 years ago, a U.S. military jet crashed in Greenland – with 4 nuclear bombs on board" (https://www.pbs.org/newshour/world/50-years-ago-a-us-military-jet-crashed-in-greenland-with-4-nuclear-bombs-on-board), PBS News Hours, (Jan 21, 2018).

K

- The unacceptability of the Doomsday Machine raises awkward, unpleasant, and complicated questions that must be considered by both policy maker and technician. If it is not acceptable to risk the lives of the three billion inhabitants of the earth in order to protect ourselves from surprise attack, then how many people would we be willing to risk? I believe that both the United States and NATO would



It doesn't even matter if we ever fire these missiles or not. They are having their effect upon us because there is a generation growing up now who cannot see past the final exclamation mark of a mushroom cloud. They are a generation who can see no moral values that do not end in a crackling crater somewhere. I'm not saying that nuclear bombs are at the root of all of it, but I think it is very, very naïve to assume that you can expose the entire population of the world to the threat of being turned to cinders without them starting to act, perhaps, a little oddly.

I believe in some sort of strange fashion that the presence of the atom bomb might almost be forcing a level of human development that wouldn't have occurred without the presence of the atom bomb. Maybe this degree of terror will force changes in human attitudes that could not have occurred without the presence of these awful, destructive things. Perhaps we are faced with a race between the Four Horseman of the Apocalypse in one line and the 7th Calvary in the other. We have not got an awful lot of mid ground between Utopia

reluctantly be willing to envisage the possibility of one or two hundred million people (i.e., about five times more than World War II deaths) dying from the immediate effects, even if one does not include deferred long-term effects due to radiation, if an all-out thermonuclear war results from a failure of Type I Deterrence. With somewhat more controversy, similar numbers would apply to Type II Deterrence. (For example, some experts would concede the statement for an all-out Soviet nuclear attack on Europe, but not if the Soviets restricted themselves to the use of conventional weapons.) We are willing to live with the possibility partly because we think of it as a remote possibility. We do not expect either kind of deterrence to fail, and we do not expect the results to be that cataclysmic if deterrence does fail.

  - Herman Kahn, *On Thermonuclear War*

- Australia's response to India's nuclear tests is the most abrasive of all the responses at the international level. On 14 May 1998 the Australian conservative coalition government decided to take action in response "to the outrageous acts perpetuated by India in conducting no less than five nuclear tests....: It announced immediate suspension of bilateral defence relations with India, withdrawal of its Defence Adviser from New Delhi, suspension of non-humanitarian aid and indefinite postponement of all ministerial and senior official visits. In fact, some Indian defence personnel who happened be on a course assignment in Australia were "physically hauled out of classrooms" and asked to leave immediately. Australia was in the forefront in criticizing India's nuclear test at various international fore. However, it did not impose any economic sanctions on India, which in any case would not have amounted to much.

  - Man Mohini Kaul, "Australia-India Relations: Post-Pokhran II Phase" (https://journals.sagepub.com/doi/abs/10.1177/002088170003700405), *International Studies*, (October 1, 2000).

- I consider your crime worse than murder... I believe your conduct in putting into the hands of the Russians the A-Bomb years before our best scientists predicted Russia would perfect the bomb has already caused, in my opinion, the Communist aggression in Korea, with the resultant casualties exceeding 50,000 and who knows but that millions more of innocent people may pay the price of your treason. Indeed, by your betrayal you undoubtedly have altered the course of history to the disadvantage of our country. No one can say that we do not live in a constant state of tension. We have evidence of your treachery all around us every day for the civilian defense activities throughout the nation are aimed at preparing us for an atom bomb attack.

  - *Judge Kaufman's Statement Upon Sentencing the Rosenbergs*. University of Missouri–Kansas City. Retrieved June 24, 2008.

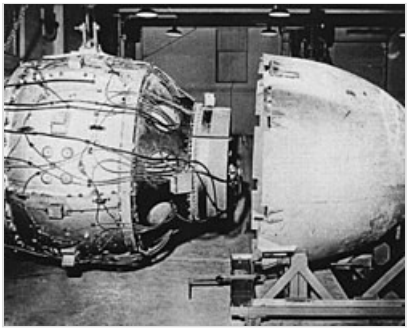
- [We must examine] the thesis that these devices, the so-called nuclear weapons, are really weapons at all—that they deserve that designation. A weapon is something with which you try to affect the purposes and the concepts of an opponent; it is not something with which you blindly destroy his entire civilization, and probably your own as well.

  - George F. Kennan, *The Nuclear Delusion: Soviet-American Relations in the Atomic Age* (1983), p. 243.

and Apocalypse, and if somehow our children ever see the day in which it is announced that we do not have these weapons any more, and that we can no longer destroy ourselves and that we've got to do something else to do with our time than they will have the right to throw up their arms, let down their streamers and let forth a resounding cheer. ~ Alan Moore

We have made a thing, a most terrible weapon, that has altered abruptly and profoundly the nature of the world. We have made a thing that, by all standards of the world we grew up in, is an evil thing. And by doing so, by our participation in making it possible to make these things, we have raised again the question of whether science is good for man, of whether it is good to learn about the world, to try to understand it, to try to control it, to help give to the world of men increased insight, increased power. Because we are scientists, we must say an unalterable yes to these questions; it is our faith and our commitment, seldom made explicit, even more seldom challenged, that knowledge is a good in itself, knowledge and such power as must come with it. ~ J. Robert Oppenheimer

- Today, every inhabitant of this planet must contemplate the day when this planet may no longer be habitable. **Every man, woman and child lives under a nuclear sword of Damocles, hanging by the slenderest of threads, capable of being cut at any moment by accident, or miscalculation, or by madness.** The weapons of war must be abolished before they abolish us.
  - John F. Kennedy, Address before the General Assembly of the United Nations (http://www.jfklibrary.org/Research/Ready-Reference/JFK-Speeches/Address-Before-the-General-Assembly-of-the-United-Nations-September-25-1961.aspx) (25 September 1961)



It did not take atomic weapons to make man want peace. But the atomic bomb was the turn of the screw. The atomic bomb made the prospect of future war unendurable. It has led us up those last few steps to the mountain pass; and beyond there is a different country. ~ J. Robert Oppenheimer

- Eighteen years ago the advent of nuclear weapons changed the course of the world as well as the war. Since that time, all mankind has been struggling to escape from the darkening prospect of mass destruction on earth. In an age when both sides have come to possess enough nuclear power to destroy the human race several times over, the world of communism and the world of free choice have been caught up in a vicious circle of conflicting ideology and interest. Each increase of tension has produced an increase of arms; each increase of arms has produced an increase of tension.
  Yesterday a shaft of light cut into the darkness. Negotiations were concluded in Moscow on a treaty to ban all nuclear tests in the atmosphere, in outer space, and under water. For the first time, an agreement has been reached on bringing the forces of nuclear destruction under international control-a goal first sought in 1946 when Bernard Baruch presented a comprehensive control plan to the United Nations.
  - John F. Kennedy, Limited Nuclear Test Ban Treaty speech Radio and Television Address to the American People on the Nuclear Test Ban Treaty (http://www.jfklibrary.org/Research/Ready-Reference/JFK-Speeches/Radio-and-Television-Address-to-the-American-People-on-the-Nuclear-Test-Ban-Treaty-July-26-1963.aspx) (26 July 1963)
- Continued unrestricted testing by the nuclear powers, joined in time by other nations which may be less adept in limiting pollution, will increasingly contaminate the air that all of us must breathe. Even then, the number of children and grandchildren with cancer in their bones, with leukemia in their blood, or with poison in their lungs might seem statistically small to some, in comparison with natural health hazards. But this is not a natural health hazard -- and it is not a statistical issue. The loss of even one human life, or the malformation of even one baby -- who may be born long after we are gone -- should be of concern to us all. Our children and grandchildren are not merely statistics toward which we can be indifferent.
  - John F. Kennedy, Limited Nuclear Test Ban Treaty speech Radio and Television Address to the American People on the Nuclear Test Ban Treaty (http://www.jfklibrary.org/Research/Ready-Reference/JFK-Speeches/Radio-and-Television-Address-to-the-American-People-on-the-Nuclear-Test-Ban-Treaty-July-26-1963.aspx) (26 July 1963)
- During the next several years, in addition to the four current nuclear powers, a small but significant number of nations will have the intellectual, physical, and financial resources to produce both nuclear weapons and the means of delivering them. In time, it is estimated, many other nations will have either this capacity or other ways of obtaining nuclear warheads, even as missiles can be commercially purchased today. I ask you to stop and think for a moment what it would mean to have nuclear weapons in so many hands, in the hands of countries large and small, stable and unstable, responsible and irresponsible, scattered throughout the world. There would be no rest for anyone then, no stability, no real security, and no chance of effective disarmament. There would only be the increased chance of accidental war, and an increased necessity for the great powers to involve themselves in what otherwise would be local conflicts. If only one thermonuclear bomb were to be dropped on any American, Russian, or any other city, whether it was launched by accident or design, by a madman or by an enemy, by a large nation or by a small, from any corner of the world, that one bomb could release more destructive power on the inhabitants of that one helpless city than all the bombs dropped in the Second World War.

- John F. Kennedy, Limited Nuclear Test Ban Treaty speech Radio and Television Address to the American People on the Nuclear Test Ban Treaty (http://www.jfklibrary.org/Research/Ready-Reference/JFK-Speeches/Radio-and-Television-Address-to-the-American-People-on-the-Nuclear-Test-Ban-Treaty-July-26-1963.aspx) (26 July 1963)

Submarine building proceeded at a furious pace in the early 1960s, as the United States strove to deploy a major component of its Strategic Triad. From 1960 to 1966 the U.S. Navy launched a total of 41 SSBNs, called the "41 for Freedom." All were named for eminent figures in American history and divided among the 5-ship George Washingtonclass, the 5-ship Ethan Allen class, and the 31-ship Lafayette/Franklin class.Initially, each boat carried 16 Polaris nuclear missiles that could be launched underwater toward distant targets. ~ Smithsonian

- Following World War II, the Soviet Union's major programs of nuclear weapon development resulted in that county's first nuclear device, named RDS1 (standing for Rossia Delaet Sama, meaning "Russia does it itself"). It was first tested in Kazakhstan on 29 August 1949, at what became known as the Semipalatinsk Test Site (STS). Until the mid-1950s, all Soviet nuclear tests were conducted above ground at STS. But in 1954 the first Soviet nuclear torpedo (the antiship weapon T-5) was under development and shortly became ready for testing. The Soviet military was eager to test it in a more realistic situation, requiring a site near a seacoast, and Novaya Zemlya was selected at that time for what became the first test in that region, an underwater test on 21 September 1955.
  - Vitaly I. Khalturin, Tatyana G. Rautian, Paul G. Richards, and William S. Leith, "A Review of Nuclear Testing by the Soviet Union at Novaya Zemlya, 1955--1990" (https://www.ldeo.columbia.edu/res/div/sgt/vitaly/VIKh_papers/khalturin_NZ_S&GS2005.pdf), *Science and Global Security*, 13:1–42, (2005). p.2
- Accurate values for the yields of Soviet nuclear tests are of particular interest. There were 496 underground nuclear tests (UNTs) conducted on USSR territory from 1949 to 1990. Among them were 340 tests at the Semipalatinsk Test Site (STS) in Kazakhstan, 117 so called Peaceful Nuclear Explosions (PNEs) at many different places on USSR territory other than at test sites, and 39 tests at the Novaya Zemlya Test Site. Soviet yields have been officially published for all 124 PNEs (including seven conducted at STS), and for 22 UNTs at STS.1
  - Vitaly I. Khalturin, Tatyana G. Rautian, Paul G. Richards, and William S. Leith, "A Review of Nuclear Testing by the Soviet Union at Novaya Zemlya, 1955--1990" (https://www.ldeo.columbia.edu/res/div/sgt/vitaly/VIKh_papers/khalturin_NZ_S&GS2005.pdf), *Science and Global Security*, 13:1–42, (2005). p.7
- I happened to read recently a remark by the American nuclear physicist W. Davidson, who noted that the explosion of one hydrogen bomb releases a greater amount of energy than all the explosions set off by all countries in all wars known in the entire history of mankind. And he, apparently, is right.
  - Nikita Khrushchev, Address to the United Nations, New York City (September 18, 1959), as reported by *The New York Times* (September 19, 1959), p. 8. The physicist quoted was eventually found to be William Davidon, associate physicist at Argonne National Laboratory, Lemont, Illinois.
- Once again there was little to inspire hope that the nuclear-weapon-possessing states are genuinely willing to give up their nuclear arsenals. The long-term modernisation programmes under way in these states suggest that nuclear weapons are still a marker of international status and power.
  - Shannon Kile in Richard Norton-Taylor, "Nuclear states developing new weapons in defiance of treaty, report claims" (https://www.theguardian.com/world/2013/jun/03/nuclear-states-developing-new-weapons-report),, ''The Guardian'', (2 Jun 2013).
- We have genuflected before the God of Science only to find that it has given us the atomic bomb, producing fears and anxieties that science can never mitigate.

- Martin Luther King, *Strength to Love*, 1963.

- The great danger facing us today is not so much the atomic bomb that was created by physical science. Not so much that atomic bomb that you can put in an aeroplane and drop on the heads of hundreds and thousands of people as dangerous as that is. But the real danger confronting civilization today is that atomic bomb which lies in the hearts and souls of men, capable of exploding into the vilest of hate and into the most damaging selfishness—that's the atomic bomb that we've got to fear today. Problem is with the men. Within the heart and the souls of men. That is the real basis of our problem.
  - Martin Luther King Jr., *Rediscovering Lost Values (http://mlk-kpp01.stanford.edu/index.php/kingpapers/article/rediscovering_lost_values/)*, Sermon delivered at Detroit's Second Baptist Church (28 February 1954).

- Israel was the sixth nation in the world -- and the first in the Middle East -- to acquire nuclear weapons. However, unlike those of the first five, its nuclear program has remained opaque, that is, shrouded in secrecy, officially unacknowledged and insulated from domestic politics. Cohen, a senior research fellow at the National Security Archive at George Washington University, analyzes in rich detail how this policy of *nuclear opacity* evolved and what made it possible.
  The policy was not the result of a well-thought-out strategy. Rather, it was a product of a series of improvisations under two Prime Ministers, David Ben-Gurion and Levi Eshkol. Neither man ever brought the issue before his Cabinet, and Israeli parties on both the left and right refrained from discussing it because of their commitment to the *sanctity of security*.
  - Lawrence Korb, "The Quiet Bomb" (https://www.nytimes.com/books/98/11/01/reviews/981101.01korblt.html), *The New York Times*, (November 1, 1998).

- The Israeli model of nuclear opacity was eventually followed by all the second-generation nuclear states: India, Pakistan and South Africa. But the South Africans dismantled their nuclear arsenal in 1991, and the Indians and Pakistanis publicly tested nuclear weapons in 1998. Thus, Israel today remains the only nuclear-opaque state in the world.
  - Lawrence Korb, "The Quiet Bomb" (https://www.nytimes.com/books/98/11/01/reviews/981101.01korblt.html), *The New York Times*, (November 1, 1998).

Only four countries in history have surrendered their nuclear weapons. And three of those countries—Belarus, Kazakhstan, and Ukraine—did so with nuclear arms that they inherited from the defunct Soviet Union, and didn't have the wherewithal to control and maintain. (The decision to dispose of this weaponry, in exchange for support from the United States and security assurances from Russia, is still remarkable; had Ukraine and Kazakhstan kept the arsenals on their territory, they would have become the world's third- and fourth-largest nuclear powers, respectively.)
Only South Africa has dismantled nuclear weapons that it constructed and controlled. In this sense, it is the closest analogue to what U.S. officials have in mind when they demand the "denuclearization of the Korean peninsula." ~ Uri Friedman

L

- **While Civil Society and a global movement work steadfastly across dozens of fields for the abolition of nuclear weapons, planning, preparations, and rehearsals for attacks using deployed H-bombs and nuclear missiles are routine in the US military and NATO.**
  US nuclear war practice takes place routinely with allied European militaries. "Steadfast Noon" is NATO's code name for its annual nuclear attack practice, and Hans Kristensen reports for the *Federation of American Scientist*s that, "This is the exercise that practices NATO's nuclear strike mission with the B61 … nuclear bombs the US deploys in Europe." Jan Meričkа wrote in *European Security Journal News* Oct. 19, 2017, that Steadfast Noon is designed "to simulate nuclear strikes… and was conducted from the Kleine Brogel Air Base in Belgium and Büchel Air Base in Germany, where US B61 thermonuclear bombs with the force of up to 340 kilotons of TNT are stored." (FYI: Hiroshima was incinerated with a 15 kiloton US bomb.)

- US and NATO Nuclear Lunacy Still Raving (https://www.counterpunch.org/2021/12/24/us-and-nato-nuclear-lunacy-still-raving/) by John Laforge (https://www.counterpunch.org/author/buchud/), *CounterPunch*, December 24, 2021

- To illustrate the Pentagon's ho-hum acceptance of mass destruction, it recently opened in Omaha its new, $1.3 billion Strategic Command headquarters for supervising and targeting the nuclear arsenal, and it named the building after General Curtis LeMay, who, the Omaha World Herald reported, designed and conducted the incendiary bombing of 60 Japanese cities at the end of WWII, bombing that "incinerated entire cities" killing as many as 900,000 civilians. General LeMay's motto and that of Strategic Command used to be "Death from Above," but after the war it was changed to "Peace is Our Profession."
  In Germany, readiness for attacks with nuclear weapons is maintained by the USAF 702nd Munitions Support Squadron, which tends to Germany's 33rd Fighter-Bomber Wing at Büchel Air Force Base. Headlines from last October's bombing "theater" included, and "NATO Holds Secret Nuclear War Exercises in Germany," "German Air Force training for nuclear war as part of NATO;" from 2017, "NATO nuclear weapons exercise unusually open"; and in 2015, "NATO nuclear weapons exercise Steadfast Noon in Büchel."
  While the uninitiated might be aghast, **the US military plans and prepares all year round for nuclear attacks** at its far-flung "Defense Nuclear Weapons School" of the Air Force Nuclear College. According to the school's website, one branch (of "Armageddon Academy") is at the Ramstein Air Force Base in Germany, the largest US military base outside the country.

  - US and NATO Nuclear Lunacy Still Raving (https://www.counterpunch.org/2021/12/24/us-and-nato-nuclear-lunacy-still-raving/) by John Laforge (https://www.counterpunch.org/author/buchud/), *CounterPunch*, December 24, 2021

- As the International Red Cross marked the 75th anniversary of the atomic bombings in Japan, it issued a strong warning that "the risk of use of nuclear weapons has risen to levels not seen since the end of the Cold War." Echoed by former Secretary Perry on the News Hour, other defense policy experts have stated forewarnings, on both the moral grounds of potential omnicidal consequences, and of new weapons technology making nuclear war more likely. Daniel Ellsberg, for example, sees governments "prepared to unleash a nuclear war which would end civilization as we know it and could kill over seven billion people."
  In our region... many thousands are in need of food assistance, and millions across the country are suffering great personal economic losses under the dual crises of the pandemic and, again, of climate-change related wildfires and storms. As the Congress budgets nearly ¾ trillion dollars for national defense, it should redirect at least a portion of this enormous sum to the current human needs and support the 2017 United Nations nuclear-weapons-ban treaty, which the work of the International Red Cross... initiated.

  - Letters: Recognition for Cadet Nurses; Ban nuclear weapons, Frances Lamberts, *Johnson City Press* (20 September 2020)

Officials of the United States also were concerned about the *Rainbow Warrior's* presence in the Pacific: Greenpeace had protested against American missile testing in Canada less than six months earlier, and the United Stated conducts a major missile testing program at the Marshall Islands in the Pacific. The Marshall Islands tests, while not currently involving nuclear explosions, still present serious hazards for ships navigating near missile targets. Frequently, these hazards extend into ocean areas outside United States territorial waters. If a vessel like the *Rainbow Warrior* entered such waters at the time of a planned test, the United States would probably have to postpone the test - at considerable cost - or remove the ship, an action that might violate international law. ~ Harvard Law Review

- The Atomic Age began at exactly 5.30 Mountain War Time on the morning of July 15, 1945, on a stretch of semi-desert land about 50 airline miles from Alamogordo, New Mexico. And just at that instance there rose from the bowels of the earth a light not of this world, the light of many suns in one. ... At first it was a giant column that soon took the shape of a supramundane mushroom.

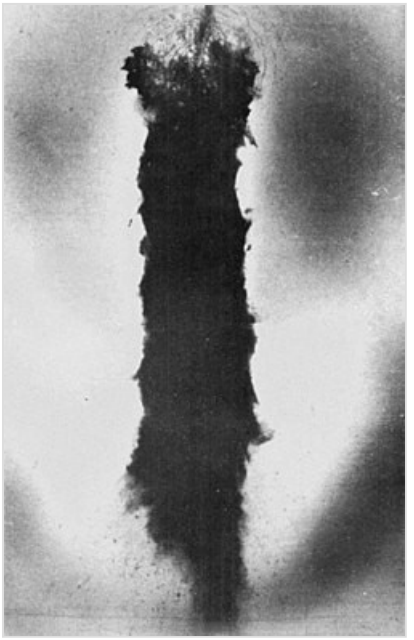
  - William L. Laurence on the first atomic explosion in New Mexico, 16 Jul 1945, *New York Times* (26 Sep 1945).

- That is the biggest fool thing we have ever done. The [atomic] bomb will never go off, and I speak as an expert in explosives.

- Admiral William D. Leahy comment on the U.S. Atomic Bomb Project, to President Harry S. Truman in 1945. *Memoirs: Year of Decisions* (1955), Vol. 1, 11.

- With the end of the Cold War, many of the arguments for and against cruise missiles have become outdated. Since almost all of the previous debate was framed in terms of the East/West conflict and the impact on the nuclear balance, the collapse of this framework has changed the significance of cruise missiles. Ground-launched cruise missiles (GLCMs) were banned under the 1987 Intermediate-range Nuclear Forces (INF) agreement. In 1991, Presidents Bush and Gorbachev agreed to remove nuclear sea-launched cruise (SLCM) and other tactical missiles from all surface ships and submarines at sea. The future deployment of nuclear air-launched cruise missiles (ALCMs) was limited under the START treaties, and production of the newer "stealth" air-launched Advanced Cruise Missile (ACM) ended in July 1993 at 460 missiles, some 1,000 fewer than had originally been planned.
  - James Lee, "Cruise Missile Testing in Canada: The Post-Cold War Debate" (http://publications.gc.ca/collections/Collection-R/LoPBdP/MR/mr114-e.htm), Political and Social Affairs Division, Parliamentary Research Branch, Depository Services Program Government of Canada, (January 21, 1994).

M



After the crash, the United States and Denmark had very different ideas about how to deal with HOBO 28's wreckage and radioactivity. The U.S. wanted to just let the bomber wreckage sink into the fjord and remain there, but Denmark wouldn't allow that. Denmark wanted all the wreckage gathered up immediately and moved, along with all of the radioactively contaminated ice, to the United States. Since the fate of the Thule Air Base hung in the balance, the U.S. agreed to Denmark's demands. ~ Timothy J. Jorgensen

- Can one imagine that The Bomb could ever be used "in a good cause"? Do not such means instantly, of themselves, corrupt any cause? The bomb is the natural product of the kind of society we have created. It is as easy, normal, and unforced an expression of the American way of Life as electric ice-boxes, banana splits, and hydro-matic drive automobiles.
  - Dwight Macdonald, "Politics" magazine, (August, 1945).

- But these Algerians were not properly warned of their danger after France's misgoverned nuclear bomb-testing campaign of the early 1960s, which vitrified vast tracts of desert with heat and plutonium and left a legacy of uncontained radiation that is still crippling inhabitants. Estimates of the number of Algerians affected by testing range from 27,000 — cited by the French Ministry of Defense — to 60,000, the figure given by Abdul Kadhim al-Aboudi, an Algerian professor of nuclear physics.
  Yet there has been little accountability for France's disregard. A compensation scheme for victims of France's nuclear tests exists, but it has made payouts to only 17 people. The majority of those were residents of French Polynesia, where France relocated its nuclear testing campaign after leaving Algeria and experimented with more than 190 nuclear bombs from 1966 to 1996.
  - Johnny Magdaleno, "Algerians suffering from French atomic legacy, 55 years after nuke tests" (http://america.aljazeera.com/articles/2015/3/1/algerians-suffering-from-french-atomic-legacy-55-years-after-nuclear-tests.html), *Al Jazeera*, (March 1, 2015).

- Any military commander who is honest with himself, or with those he's speaking to, will admit that he has made mistakes in the application of military power. He's killed people unnecessarily—his own troops or other troops—through mistakes, through errors of judgment. A hundred, or thousands, or tens of thousands, maybe even a hundred thousand. But… he hasn't destroyed nations. And the conventional wisdom is *don't make the same mistake twice, learn from your mistakes*. And we all do. Maybe we make the same mistake three times, but hopefully not four or five. But there will be *no learning period* with nuclear weapons. You make one mistake and you're going to destroy nations.

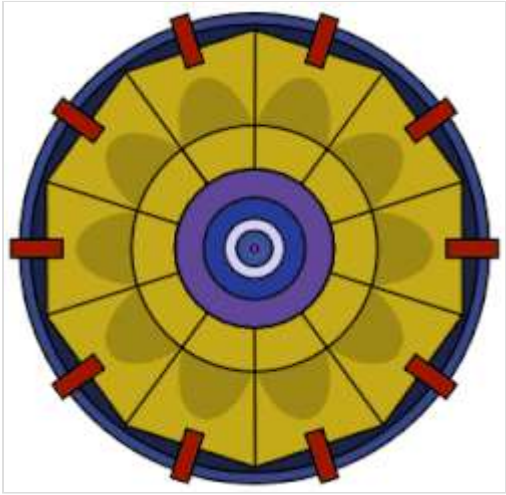
- Robert McNamara, in *The Fog of War*.

- I will have nothing to do with a bomb!
  - Lise Meitner Response to being invited (1943) to work with Otto Robert Frisch and some British scientists at Los Alamos during the Manhattan Project to create the atomic bomb. life inRuth Sime, Lise Meitner: A Life in Physics (1996), 305.

- If we ourselves happen to survive, are any of us prepared to press the button or allow our elected representatives to command that this be done, in the certainty that it will kill millions of other people?
  - Naomi Mitchison, "Questions for Inner Cabinet", *Glasgow Herald*, 35th July 1980.

- The future of mankind is going to be decided within the next two generations, and there are two absolute requisites: We must aim at a stable-state society [with limited population growth] and the destruction of nuclear stockpiles. … Otherwise I don't see how we can survive much later than 2050.
  - Jacques Monod quoted in John C. Hess, 'French Nobel Biologist Says World Based On Chance', New York Times (15 Mar 1971), 6.

- It doesn't even matter if we ever fire these missiles or not. They are having their effect upon us because there is a generation growing up now who cannot see past the final exclamation mark of a mushroom cloud. They are a generation who can see no moral values that do not end in a crackling crater somewhere. I'm not saying that nuclear bombs are at the root of all of it, but I think it is very, very naïve to assume that you can expose the entire population of the world to the threat of being turned to cinders without them starting to act, perhaps, a little oddly.
  I believe in some sort of strange fashion that the presence of the atom bomb might almost be forcing a level of human development that wouldn't have occurred without the presence of the atom bomb. Maybe this degree of terror will force changes in human attitudes that could not have occurred without the presence of these awful, destructive things. Perhaps we are faced with a race between the Four Horseman of the Apocalypse in one line and the 7th Calvary in the other. We have not got an awful lot of mid ground between Utopia and Apocalypse, and if somehow our children ever see the day in which it is announced that we do not have these weapons any more, and that we can no longer destroy ourselves and that we've got to do something else to do with our time than they will have the right to throw up their arms, let down their streamers and let forth a resounding cheer.
  - Alan Moore on the issue of nuclear weapons, in *England Their England : Monsters, Maniacs and Moore* (1987) (https://www.youtube.com/watch?v=Hv44V4d_fDQ)



[After the flash of the atomic bomb test explosion] Fermi got up and dropped small pieces of paper … a simple experiment to measure the energy liberated by the explosion … [W]hen the front of the shock wave arrived (some seconds after the flash) the pieces of paper were displaced a few centimeters in the direction of propagation of the shock wave. From the distance of the source and from the displacement of the air due to the shock wave, he could calculate the energy of the explosion. This Fermi had done in advance having prepared himself a table of numbers, so that he could tell immediately the energy liberated from this crude but simple measurement. … It is also typical that his answer closely approximated that of the elaborate official measurements. The latter, however, were available only after several days' study of the records, whereas Fermi had his within seconds. ~ Emilio Segre

N

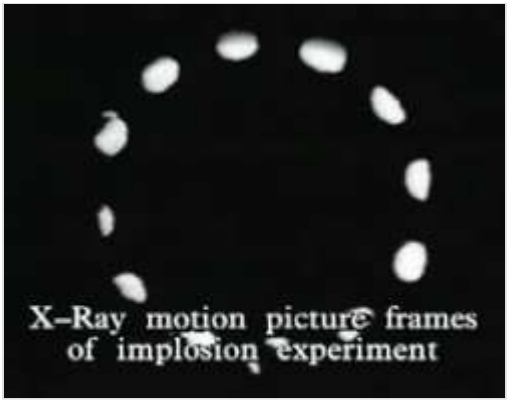
- Russian inventory of nuclear weapons, particularly tactical weapons, remains larger than any other in the world. In its report, the NIC indicated that it remained "concerned about vulnerabilities to an insider who attempts unauthorized actions" at Russian nuclear weapons storage facilities. Similarly, the NIC noted that "Russian facilities housing weapons-usable nuclear material . . . typically receive low funding, lack trained security personnel, and do not have sufficient equipment for securely storing such material." As a

result, security “varies widely among the different types of Ministry of Atomic Energy (Minatom) facilities and other Russian institutes. The NIC report concludes by noting that over the course of the last seven years, “Moscow has recognized the need for security improvements and, with assistance from the United States and other countries, has taken steps to reduce the risk of theft of its nuclear weapons and material.”

  - National Intelligence Council, *Annual Report to Congress on the Safety and Security of Russian Nuclear Facilities and Military Forces*, (February 2003), p. 2.; as quoted in p.4.

- In keeping with the great secrecy involved in India's efforts to develop and test its first nuclear explosive device, the project employed no more than 75 scientists and engineers working on it in the period from 1967 to 1974. Of course this does not count the thousands of individuals required to build and operate the infrastructure supporting BARC and to produce the plutonium for the device.
  Outside of those actually working on the project, only about three other people in India knew of it - Prime Minister Indira Gandhi, her trusted adviser and former principal secretary P.N. Haksar, and her current principal secretary D.P. Dhar. No government ministers, including the Defense Minister, were informed.
  The implosion system was designed to compress the core to twice its normal density. The lenses that were developed used the fast-slow explosive design pioneered by the U.S. in World War II. Like the Gadget exploded at Trinity in 1945, they used an RDX-TNT mixture as the fast explosive, with baratol (barium nitrate and TNT) used as the slow explosive. Chengappa describes the inner slow explosive component as being in the shape of "Shiva ling am" -- a phallus in Hindu religious art which is squat and blunt in form. The device used 12 lens, which is described by Chengappa [pg. 182]: "the way the explosives were placed around the plutonium sphere resembled the petals of the lotus". This presumably indicates that each hemisphere of the implosion system consisted of 6 longitudinal lens segments (asymmetric diamond shaped lenses) joined together at the pole so that they formed triangular teeth at the equator which interlocked with the opposite hemisphere. This design is simpler and less sophisticated than the 32-lens "soccer ball" system developed by the U.S. during World War II.

  - *Nuclearweaponarchive.org*, "India's Nuclear Weapons Program" (http://nuclearweaponarchive.org/India/IndiaSmiling.html), (November 8, 2001).



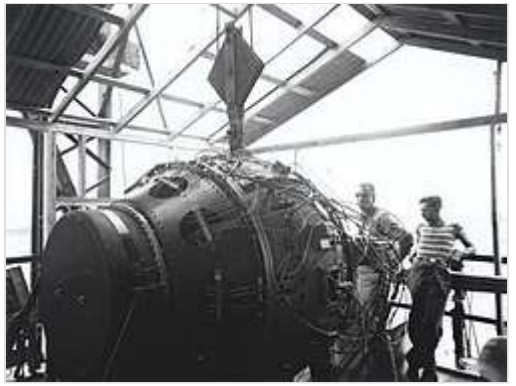
To my knowledge there are no written accounts of Fermi’s contributions to the [first atomic bomb] testing problems, nor would it be easy to reconstruct them in detail. This, however, was one of those occasions in which Fermi’s dominion over all physics, one of his most startling characteristics, came into its own. The problems involved in the Trinity test ranged from hydrodynamics to nuclear physics, from optics to thermodynamics, from geophysics to nuclear chemistry. Often they were closely interrelated, and to solve one’it was necessary to understand all the others. Even though the purpose was grim and terrifying, it was one of the greatest physics experiments of all time. Fermi completely immersed himself in the task. At the time of the test he was one of the very few persons (or perhaps the only one) who understood all the technical ramifications.
~ Emilio Segre

O

- If I had told you eight years ago that America would reverse a great recession, reboot our auto industry, and unleash the longest stretch of job creation in our history . . . open up a new chapter with the Cuban people, **shut down Iran's nuclear weapons program without firing a shot**, take out the mastermind of 9/11 . . . win marriage equality, and secure the right to health insurance for another 20 million of our fellow citizens . . . you might have said our sights were set a little too high. **But that's what we did. That's what you did.**

  - Barack Obama, "President Obama's Farewell Address (https://obamawhitehouse.archives.gov/farewell)," the White House archives (January 10, 2017)

- Ukraine, Kazakhstan and Belarus, three states of the former Soviet Union that have nuclear arms on their territory, formally agreed with the United States and Russia today to give up those weapons by the end of the decade and not to seek nuclear arms again.
  In a wordless, austere ceremony in the barroom of a Lisbon hotel, Secretary of State James A. Baker III and officials of Russia and the three other nuclear-armed former Soviet republics signed a protocol, or legal supplement, to the 1991 Strategic Arms Reduction Treaty (START), pledging to carry out its terms.
  They thus laid the groundwork for ratification of the landmark START treaty and for permitting negotiations to go ahead between the United States and Russia for deeper cutbacks in nuclear arms.
  The full significance of the occasion, which took months of difficult negotiation to arrange, went far beyond the pale legalism of the six-page documents the diplomats signed. Today's ceremony was a hard-won milestone in a mostly invisible, yet intense diplomatic struggle to maintain control over the world's largest and most awesome array of long-range nuclear weapons, as the Soviet Union, the nation that created and held them during the decades of the Cold War, splintered into more than a dozen parts.
  - Don Oberdorfer,"3 EX-SOVIET STATES TO GIVE UP A-ARMS" (https://www.washingtonpost.com/archive/politics/1992/05/24/3-ex-soviet-states-to-give-up-a-arms/bf3284ee-c7e9-4b09-bdf7-12c726f033be/), *Washington Post*, May 24, 1992



Knowing he [Bob Serber] was going to the [first atom bomb] test, I asked him how he planned to deal with the danger of rattlesnakes. He said, 'I'll take along a bottle of whiskey.' … I ended by asking, 'What would you do about those possibilities [of what unknown phenomena might cause a nuclear explosion to propagate in the atmosphere]?' Bob replied, 'Take a second bottle of whiskey.' ~ Edward Teller

- The flame from the angel's sword in the Garden of Eden has been catalyzed into the atom bomb; God's thunderbolt became blunted, so Man's dunderbolt [sic] has become the Steel Star of Destruction.
  - Seán O'Casey, *Sunset and Evening Star*, 1954.
- I am become death, The Shatterer of Worlds.
  - J. Robert Oppenheimer, quoting from the 2,000-year-old Bhagavad Gita of India at the instant the first test atomic device exploded. Abraham Pais and Robert P. Crease, J. Robert Oppenheimer: a Life (2006), 44. Also seen translated as "I am become Death, the destroyer of worlds.
  - We knew the world would not be the same. A few people laughed, a few people cried, most people were silent. I remembered the line from the Hindu scripture the Bhagavad Gita. Vishnu is trying to persuade the prince that he should do his duty and to impress him takes on his multiarmed form and says, "Now, I am become Death, the destroyer of worlds." I suppose we all thought that one way or another.
  - J. Robert Oppenheimer, *The Decision To Drop The Bomb*; Pontin, Jason (November–December 2007). "Oppenheimer's Ghost". Technology Review.
- When you see something that is technically sweet, you go ahead and do it and argue about what to do about it only after you've had your technical success. That is the way it was with the atomic bomb.
  - J. Robert Oppenheimer, testifying in his defense in his 1954 security hearings (page 81 of the official transcript). Quoted in Charles Thorpe, *Oppenheimer: The Tragic Intellect*. University of Chicago Press,2008 (pp. 223-4).
- We have made a thing, a most terrible weapon, that has altered abruptly and profoundly the nature of the world. We have made a thing that, by all standards of the world we grew up in, is an evil thing. And by doing so, by our participation in making it possible to make these things, we have raised again the question of whether science is good for man, of whether it is good to learn about the world, to try to understand it, to try

to control it, to help give to the world of men increased insight, increased power. Because we are scientists, we must say an unalterable yes to these questions; it is our faith and our commitment, seldom made explicit, even more seldom challenged, that knowledge is a good in itself, knowledge and such power as must come with it.

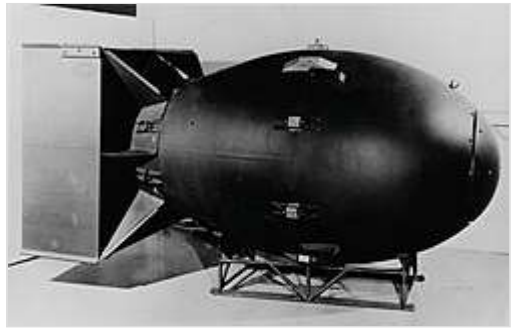
  - J. Robert Oppenheimer, Speech to the American Philosophical Society (Jan 1946). *Atomic Weapons*, printed in Proceedings of the American Philosophical Society, 90(1), 7-10. In Deb Bennett-Woods, Nanotechnology: Ethics and Society (2008), 23. Identified as a speech to the society in Kai Bird, Martin J. Sherwin, American Prometheus: the Triumph and Tragedy of J. Robert Oppenheimer (2005), 323

- But when you come right down to it, the reason that we did this job is because it was an organic necessity. If you are a scientist you cannot stop such a thing. If you are a scientist you believe that it is good to find out how the world works; that it is good to find out what the realities are; that it is good to turn over to mankind at large the greatest possible power to control the world and to deal with it according to its lights and values.

  - J. Robert Oppenheimer, regarding the atomic bomb project from speech at Los Alamos (17 Oct 1945). Quoted in David C. Cassidy, J. *Robert Oppenheimer and the American Century* (2009), 214.

- Despite the vision and the far-seeing wisdom of our wartime heads of state, the physicists felt a peculiarly intimate responsibility for suggesting, for supporting, and in the end, in large measure, for achieving the realization of atomic weapons. Nor can we forget that these weapons, as they were in fact used, dramatized so mercilessly the inhumanity and evil of modern war. In some sort of crude sense which no vulgarity, no humor, no overstatement can quite extinguish, the physicists have known sin; and this is a knowledge which they cannot lose.

  - J. Robert Oppenheimer, *The Open Mind* (1955), 88



Having found the bomb we have used it. We have used it against those who attacked us without warning at Pearl Harbor, against those who have starved and beaten and executed American prisoners of war, against those who have abandoned all pretense of obeying international laws of warfare. We have used it in order to shorten the agony of war, in order to save the lives of thousands and thousands of young Americans.
We shall continue to use it until we completely destroy Japan's power to make war. Only a Japanese surrender will stop us. ~ Harry Truman

- If atomic bombs are to be added as new weapons to the arsenals of a warring world, or to the arsenals of nations preparing for war, then the time will come when mankind will curse the names of Los Alamos and Hiroshima. The people must unite, or they will perish.

  - J. Robert Oppenheimer, Speech at Fuller Lodge when the U.S. Army was honouring the work at Los Alamos. (16 Oct 1945). Quoted in Kai Bird, Martin J. Sherwin, *American Prometheus: the Triumph and Tragedy of J. Robert Oppenheimer* (2005), 323.

- It did not take atomic weapons to make man want peace. But the atomic bomb was the turn of the screw. The atomic bomb made the prospect of future war unendurable. It has led us up those last few steps to the mountain pass; and beyond there is a different country.

  - J. Robert Oppenheimer, Commencement address (1946), as quoted in book review, William J. Broad, *The Men Who Made the Sun Rise*, *New York Times Book Review* (8 Feb 1987), 39.

P

- Congress reacted in 1946 by creating the Atomic Energy Commission (AEC) to oversee nuclear development. Responding to the threat of a Soviet nuclear program, the AEC authorized nuclear weapons tests in the South Pacific, and then later decided the Nevada desert would be

less vulnerable to attack. In December 1950, the commission recommended establishing a permanent proving ground on a piece of the old Las Vegas Bombing and Gunnery Range. Truman concurred, and the first atmospheric detonation at the Nevada Test Site, a one-kiloton bomb dropped on Frenchman Flat, took place a month later. The U.S. nuclear testing program continued for 41 years and included 928 nuclear tests (with 1,021 total detonations). Most were underground, but 100 tests were atmospheric, or out in the open. Today, as the Nevada National Security Site, it is still used for radioactive waste storage, first-responder training, “subcritical” nuclear tests, and other projects.

  - Samir S. Patel, "Dawn of a Thousand Suns" (https://www.archaeology.org/issues/152-1411/features/2592-united-states-atomic-age-archaeology#art_page2), *Archaeology*, (November/December 2014).

- The only people who should be allowed to govern countries with nuclear weapons are mothers, those who are still breast-feeding their babies.

  - Tsutomu Yamaguchi, who lived in Hiroshima when it was hit by an atomic bomb, survived, chose to move to Nagasaki, which was then hit by another atomic bomb, and survived that, too, living until 2010, all according to Steven Pinker.
  - Steven Pinker, *The Better Angels of Our Nature: Why Violence Has Declined* (N.Y.: Viking, hardback 2011 ISBN 978-0-670-02295-3, p. 684.

- In plain words; now that Britain has told the world she has the H-Bomb, she should announce as early as possible that she has done with it, that she proposes to reject, in all circumstances, nuclear warfare. This is not pacifism. There is no suggestion here of abandoning the immediate defence of this island.... No, what should be abandoned is the idea of deterrence-by-threat-of-retaliation. There is no real security in it, no decency in it, no faith, hope, nor charity in it.

  - J. B. Priestley, "Britain and the Nuclear Bombs", *The New Statesman*, 2 November 1957.

I am not sure it can ever be used... I don't think we ought to use this thing unless we absolutely have to. It is a terrible thing to order the use of something that is so terribly destructive, destructive beyond anything we have ever had. You have got to understand that this isn’t a military weapon. It is used to wipe out women and children and unarmed people, and not for military uses. So we have got to treat this differently from rifles and cannon and ordinary things like that. ~ Harry Truman

- Seeking to maintain its status as a global power after the Second World War, Britain tested 12 atomic bombs in Australia between 1952 and 1957. But when the major powers developed more powerful hydrogen bombs — the United States in 1952 and the Soviet Union in 1953 — Britain followed suit. After being refused H-Bomb test sites in Australia and New Zealand, the UK government decided to test its thermonuclear weapons in the British Gilbert and Ellice Islands Colony – today, part of the Pacific nation of Kiribati. Under Operation Grapple, nine hydrogen and atomic bomb tests were held at Malden Island and Christmas (Kiritimati) Island between May 1957 and September 1958.

  - Catherine Putz, "Grappling with the Bomb: 60 Years After Britain’s Pacific Hydrogen Bomb Tests" (https://thediplomat.com/2017/09/grappling-with-the-bomb-60-years-after-britains-pacific-hydrogen-bomb-tests/), *The Diplomat*. (September 30, 2017).

- During the Cold War, successive British governments regarded nuclear weapons as a symbol of technological prowess and global status. Sir Winston Churchill’s scientific adviser Lord Cherwell argued that the development of hydrogen as well as atomic weapons was central to maintaining Britain’s status as an imperial power: “If we are unable to make the Bomb ourselves and have to rely entirely on the United States for this vital weapon, we shall sink to the rank of a second class nation, only permitted to supply auxiliary troops, like the native levies who were supplied small arms but not artillery.”

- Catherine Putz, "Grappling with the Bomb: 60 Years After Britain's Pacific Hydrogen Bomb Tests" (https://thediplomat.com/2017/09/grappling-with-the-bomb-60-years-after-britains-pacific-hydrogen-bomb-tests/), *The Diplomat*. (September 30, 2017).

- Between 1946 and 1996, there were more than 315 U.S., British and French nuclear tests at ten sites across the region. Many of the workers and military personnel who staffed the Pacific test sites, as well as indigenous communities on neighboring atolls, have faced serious health problems in the aftermath. During my interviews with the ageing survivors of Operation Grapple, I was told of cases of leukemia, cancer and sterility. Unlike the United States and France, which have established compensation schemes for nuclear survivors (however insufficient), the United Kingdom claims its tests were safe. The UK Ministry of Defence has fought every legal challenge brought by the nuclear veterans, who attribute many illnesses to their presence on Christmas Island.
    - Catherine Putz, "Grappling with the Bomb: 60 Years After Britain's Pacific Hydrogen Bomb Tests" (https://thediplomat.com/2017/09/grappling-with-the-bomb-60-years-after-britains-pacific-hydrogen-bomb-tests/), *The Diplomat*. (September 30, 2017).

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R

- Suddenly, there was an enormous flash of light, the brightest light I have ever seen or that I think anyone has ever seen. It blasted; it pounced; it bored its way into you. It was a vision which was seen with more than the eye. It was seen to last forever. You would wish it would stop; altogether it lasted about two seconds.
    - Isidor Isaac Rabi, witnessing the first atomic bomb test explosion, in *Science: the Center of Culture* (1970), 139.

- The Pokhran test was a bomb, I can tell you now.... An explosion is an explosion, a gun is a gun, whether you shoot at someone or shoot at the ground.... I just want to make clear that the test was not all that peaceful.
    - Raja Ramanna, speaking to the *Press Trust of India*, (10 October 1997).

- I call upon the scientific community in our country, those who gave us nuclear weapons, to turn their great talents now to the cause of mankind and world peace, to give us the means of rendering those nuclear weapons impotent and obsolete.
    - Ronald Reagan concerning his proposed Strategic Defense Initiative, later to be known as 'Star Wars.' National address (23 Mar 1983)

- I'm in the middle of writing a book about American disarmament. And it's kept me deeply depressed. Because in order to study disarmament, you first have to study American armament. We've been the most irresponsible nuclear power the world has ever seen. Some people may say, "but we've only used nuclear weapons once." But that's not true. You don't just use nuclear weapons by dropping them. When you realize how many times we've put them on the table and considered using them, it's incredible...
    - Scott Ritter, Scott Ritter Says Controversial Things About Clinton, Bush, Fox News, the Surge, etc., Interview with the *Memphis Flyer* (http://www.memphisflyer.com/memphis/Content?oid=oid%3A42834),

(May 2008)

- It's ironic that the... the one President the Democrats love to hate more than George W. Bush -- Ronald Wilson Reagan -- was actually the most responsible President we've had regarding nuclear weapons since Eisenhower. He sat down with Gorbachev and we got incredibly close to eliminating all nuclear weapons. We got rid of two classes of nuclear weapons and were moving in the direction of greater arms reduction
  In terms of sheer numbers our nuclear arsenal kept growing. We'd eliminate one thing then make more of something else. It was a shell game.... Have we ever actually significantly reduced the number of nuclear arms with intent to permanently shrink the arsenal? Well no, not yet. But Reagan was at least moving in that direction. He's the only president who considered going down [in number of nuclear weapons]. But we have built new classes of weapons. Nuclear weapons are now a part of our defense policy, and we even consider the use of nuclear weapons in a non-nuclear environment.
  - Scott Ritter, Scott Ritter Says Controversial Things About Clinton, Bush, Fox News, the Surge, etc., Interview with the *Memphis Flyer* (http://www.memphisflyer.com/memphis/Content?oid=oid%3A42834), (May 2008)

- Nuclear weapon: an agency reserved for use by the most civilized nations for the settlement of disputes that might become troublesome if left unadjusted. Unfortunately, too many formerly uncivilized nations are becoming civilized.
  - Leonard Rossiter in the *Devil's Bedside Book*

- When India and Pakistan conducted their nuclear tests in 1998, even those of us who condemned them, balked at the hypocrisy of Western nuclear powers. Implicit in their denunciation of the tests was the notion that Blacks cannot be trusted with the Bomb. Now we are presented with the spectacle of our governments competing to confirm that belief.
  - Arundhati Roy, War Talk, *CounterPunch* (https://www.counterpunch.org/2002/06/02/war-talk/), (June 2, 2002)

- It’s not just the one million soldiers on the border who are living on hair-trigger alert. It’s all of us. That’s what nuclear bombs do. Whether they’re used or not, they violate everything that is humane. They alter the meaning of life itself. Why do we tolerate them? Why do we tolerate these men who use nuclear weapons to blackmail the entire human race?
  - Arundhati Roy, War Talk, *CounterPunch* (https://www.counterpunch.org/2002/06/02/war-talk/), (June 2, 2002)

- It's so frightening, the nationalism in the air... It can be used to do anything. I know that **a world in which countries are stockpiling nuclear weapons and using them in the ways that India and Pakistan and America do to oppress others and to deceive their own people is a dangerous world.**
  - Arundhati Roy, Interview with David Barsamian, *The Progressive* magazine (https://progressive.org/magazine/interview-arundhati-roy-Barsamian/), (July 16, 2007)

With the end of the Second World War, the Soviet Union was now high on the list of tyrannical enemies of democracy, and American nuclear weapons development and strategic theory were fashioned with that enemy foremost in mind. Oppenheimer’s sympathy for Communism, his enthusiasm for world government as the ultimate arbiter of nuclear technology, and his qualms about the proposed second generation of nuclear weapons, played a critical role in the history of the Cold War and in the precipitous course of his subsequent career. Already, in the fall of 1945, when Edward Teller was pressing for immediate development of the hydrogen bomb (the “Super,” as it was called), Oppenheimer responded coldly and tersely: “I neither can nor will do so.” Oppenheimer regarded the Super as a genocidal weapon: its only conceivable purpose would be the destruction of civilian populations by the millions — and ideally in the tens or hundreds of millions.

- Amazing, the respect that nuclear weapons bring.
  - Rudy Rucker in *The Sex Sphere*, p. 74

The sole end of war with H-bombs would be annihilation. The peace that such a war would bring would be that of the mass grave; and if there were any survivors, they would likely prefer to have been among the dead. Civilization would have to be reconstituted from radioactive ash. ~ Algis Valiunas

S

- Imagine a room awash in gasoline, and there are two implacable enemies in that room. One of them has nine thousand matches. The other has seven thousand matches. Each of them is concerned about who's ahead, who's stronger. Well that's the kind of situation we are actually in. The amount of weapons that are available to the United States and the Soviet Union are so bloated, so grossly in excess of what's needed to dissuade the other, that if it weren't so tragic, it would be laughable. What is necessary is to reduce the matches and to clean up the gasoline.
  - Carl Sagan, during a panel discussion in ABC News Viewpoint following the TV movie The Day After (20 Nov 1983). Misquoted as “The nuclear arms race is like two sworn enemies standing waist deep in gasoline, one with three matches, the other with five.”
- The atomic bomb is a marvelous gift that was given to our country by a wise God.
  - Phyllis Schlafly, quoted in Rosemary Chalk, "Women and the National Security Debate", in *Bulletin of the Atomic Scientists*, August/September 1982.
- **Eric Schlosser**: At one point we only thought we needed 50 to 200 nuclear weapons to annihilate the Soviet Union, and by the 1960's we had 32,000.
  - Eric Schlosser, "Command and Control" (http://www.pbs.org/wgbh/americanexperience/films/command-and-control/#transcript), *American Experience*, *PBS*, (April 25, 2017).

There is Dimona nuclear reactor, and Israel ownership of weapon mass destruction, no one raises this issue, this is extremely dangerous. ~ Muammar Gaddafi

- **Eric Schlosser**: One of the weapons in particular went through all of its arming steps to detonate, and when that weapon hit the ground, a firing signal was sent. And the only thing that prevented a full-scale detonation of a powerful hydrogen bomb in North Carolina was a single safety switch.
  - Eric Schlosser, "Command and Control" (http://www.pbs.org/wgbh/americanexperience/films/command-and-control/#transcript), *American Experience*, *PBS*, (April 25, 2017).
- **Eric Schlosser**: During a fire, solder might melt on a circuit board. It created all kinds of new electrical pathways that could completely circumvent a safety device.
  - Eric Schlosser, "Command and Control" (http://www.pbs.org/wgbh/americanexperience/films/command-and-control/#transcript), *American Experience*, *PBS*, (April 25, 2017).
- Nuclear weapons are the most lethal machines ever invented, but the deterrence they provide is something intangible. "The central objective of a deterrent weapon system… is psychological," a classified Pentagon report once explained. "The mission is persuasion."
  - Eric Schlosser, "Nuclear weapons: an accident waiting to happen" (https://www.theguardian.com/world/2013/sep/14/nuclear-weapons-accident-waiting-to-happen), *The Guardian*, (14 Sep 2013).

- In 1946, the US conducted its first postwar tests of the atomic bomb. One of these tests sought to discover the effect of a nuclear blast on a fleet of warships. The results were discouraging. Of the 88 ships moored near the point of detonation, in the Bikini atoll, only five sank. The Evaluation Of The Atomic Bomb As A Military Weapon, a top-secret report sent to Harry Truman, concluded that "ships at sea" and "bodies of troops" were poor targets. "The bomb is pre-eminently a weapon for use against human life and activities in large urban and industrial areas," the report argued. Such weapons were useful, most of all, for killing and terrorising civilians. According to the report, some of the best targets were "cities of especial sentimental significance".
    - Eric Schlosser, "Nuclear weapons: an accident waiting to happen" (https://www.theguardian.com/world/2013/sep/14/nuclear-weapons-accident-waiting-to-happen), *The Guardian*, (14 Sep 2013).
- The Pentagon's official list of "broken arrows" – mishaps with nuclear weapons that might threaten the public – mentions 32 accidents. Yet a 1970 study by one of America's nuclear weapon laboratories, obtained through the Freedom of Information Act, stated that at least 1,200 weapons were involved in accidents between 1950 and 1968. Most of these accidents were trivial, but a number of serious ones were somehow omitted from the Pentagon's list. Moreover, the risk of accidental nuclear detonations was not fully understood by American weapon designers until the late 1960s, and it proved far greater than expected. A plane crash, a fire, a missile explosion, lightning, human error, even dropping a weapon from an aircraft parked on a runway were found to be potential causes of a nuclear explosion.
    - Eric Schlosser, "Nuclear weapons: an accident waiting to happen" (https://www.theguardian.com/world/2013/sep/14/nuclear-weapons-accident-waiting-to-happen), *The Guardian*, (14 Sep 2013).
- In the 1960 presidential election, Kennedy had cynically attacked Richard Nixon from the right, claiming that the Ike Eisenhower-Nixon administration had allowed a dangerous “missile gap” to grow in the U.S.S.R.’s favor. But in fact, just as Eisenhower and Nixon had suggested—and just as the classified briefings that Kennedy received as a presidential candidate indicated—the missile gap, and the nuclear balance generally, was overwhelmingly to America’s advantage. At the time of the missile crisis, the Soviets had 36 intercontinental ballistic missiles (ICBMs), 138 long-range bombers with 392 nuclear warheads, and 72 submarine-launched ballistic-missile warheads (SLBMs). These forces were arrayed against a vastly more powerful U.S. nuclear arsenal of 203 ICBMs, 1,306 long-range bombers with 3,104 nuclear warheads, and 144 SLBMs—all told, about nine times as many nuclear weapons as the U.S.S.R. Nikita Khrushchev was acutely aware of America’s huge advantage not just in the number of weapons but in their quality and deployment as well.
    - Benjamin Schwarz, “The Real Cuban Missile Crisis” (https://www.theatlantic.com/magazine/archive/2013/01/the-real-cuban-missile-crisis/309190/), *The Atlantic*, January/February 2013.
- To my knowledge there are no written accounts of Fermi’s contributions to the [first atomic bomb] testing problems, nor would it be easy to reconstruct them in detail. This, however, was one of those occasions in which Fermi’s dominion over all physics, one of his most startling characteristics, came into its own. The problems involved in the Trinity test ranged from hydrodynamics to nuclear physics, from optics to thermodynamics, from geophysics to nuclear chemistry. Often they were closely interrelated, and to solve one’it was necessary to understand all the others. Even though the purpose was grim and terrifying, it was one of the greatest physics experiments of all time. Fermi

There is one question today that is more important than any other question that could possibly be asked, and it’s this: Is what the U.S. and its allies are trying to accomplish in Ukraine worth continually risking nuclear armageddon for? ~ Caitlin Johnstone (https://consortiumnews.com/2022/03/01/caitlin-johnstone-the-single-most-important-question-in-the-world-right-now/)

I call upon the scientific community in our country, those who gave us nuclear weapons, to turn their great talents now to the cause of mankind and world peace, to give us the means of rendering those nuclear weapons impotent and obsolete. ~ Ronald Reagan

completely immersed himself in the task. At the time of the test he was one of the very few persons (or perhaps the only one) who understood all the technical ramifications.

  - Emilio Segrè in *Enrico Fermi: Physicist* (1970), 145

- The most striking impression was that of an overwhelming bright light. I had seen under similar conditions the explosion of a large amount—100 tons—of normal explosives in the April test, and I was flabbergasted by the new spectacle. We saw the whole sky flash with unbelievable brightness in spite of the very dark glasses we wore. Our eyes were accommodated to darkness, and thus even if the sudden light had been only normal daylight it would have appeared to us much brighter than usual, but we know from measurements that the flash of the bomb was many times brighter than the sun. In a fraction of a second, at our distance, one received enough light to produce a sunburn. I was near Fermi at the time of the explosion, but I do not remember what we said, if anything. I believe that for a moment I thought the explosion might set fire to the atmosphere and thus finish the earth, even though I knew that this was not possible.
  - Emilio Segrè in *Enrico Fermi: Physicist* (1970), 147.
- [After the flash of the atomic bomb test explosion] Fermi got up and dropped small pieces of paper … a simple experiment to measure the energy liberated by the explosion … [W]hen the front of the shock wave arrived (some seconds after the flash) the pieces of paper were displaced a few centimeters in the direction of propagation of the shock wave. From the distance of the source and from the displacement of the air due to the shock wave, he could calculate the energy of the explosion. This Fermi had done in advance having prepared himself a table of numbers, so that he could tell immediately the energy liberated from this crude but simple measurement. … It is also typical that his answer closely approximated that of the elaborate official measurements. The latter, however, were available only after several days' study of the records, whereas Fermi had his within seconds.
  - Emilio Segrè in *Enrico Fermi: Physicist* (1970), 147-148.
- In an enterprise such as the building of the atomic bomb the difference between ideas, hopes, suggestions and theoretical calculations, and solid numbers based on measurement, is paramount. All the committees, the politicking and the plans would have come to naught if a few unpredictable nuclear cross sections had been different from what they are by a factor of two.
  - Emilio Segrè, *Epigraph in Richard Rhodes, The Making of the Atomic Bomb* (1986), 8.
- If some nuclear properties of the heavy elements had been a little different from what they turned out to be, it might have been impossible to build a bomb.
  - Emilio Segrè, *In Enrico Fermi: Physicist* (1970), 149.

Imagine a room awash in gasoline, and there are two implacable enemies in that room. One of them has nine thousand matches. The other has seven thousand matches. Each of them is concerned about who's ahead, who's stronger. Well that's the kind of situation we are actually in. The amount of weapons that are available to the United States and the Soviet Union are so bloated, so grossly in excess of what's needed to dissuade the other, that if it weren't so tragic, it would be laughable. What is necessary is to reduce the matches and to clean up the gasoline. ~ Carl Sagan

- On the morning of Sept. 14, 1954, in the Ural Mountains about 600 miles southeast of Moscow, the Soviet military exploded an atomic bomb in the air near 45,000 Red Army troops and thousands of civilians as part of a military exercise.
  How many people were killed or maimed or became ill as a result of the exercise may never be known. But a film of the test recently obtained from secret Soviet military archives sheds new light on the often reckless nuclear testing during the cold war and the use of people as guinea pigs, nuclear specialists say.

- Marlise Simons, "Soviet Atom Test Used Thousands As Guinea Pigs, Archives Show" (https://www.nytimes.com/1993/11/07/world/soviet-atom-test-used-thousands-as-guinea-pigs-archives-show.html), *The New York Times*, (Nov. 7, 1993).

- There was a lot of protest after Bravo, from countries like India, for example. India was the first country which came forward and proposed at the United Nations that all of these nuclear tests should be stopped, that there should be a complete ban on nuclear testing.
  - Martha Smith, historian, in "Martha Smith on: The Impact of the Bravo Test" (http://www.pbs.org/wgbh/amex/bomb/filmmore/reference/interview/marthasmith01.html) a PBS interview for *Race for the Superbomb* on *American Experience*

- Submarine building proceeded at a furious pace in the early 1960s, as the United States strove to deploy a major component of its Strategic Triad. From 1960 to 1966 the U.S. Navy launched a total of 41 SSBNs, called the "41 for Freedom." All were named for eminent figures in American history and divided among the 5-ship George Washingtonclass, the 5-ship Ethan Allen class, and the 31-ship Lafayette/Franklin class.Initially, each boat carried 16 Polaris nuclear missiles that could be launched underwater toward distant targets.
  - *Smithsonian*, "Boomers" (https://americanhistory.si.edu/subs/const/anatomy/boomers/index.html), *American History*.

- The dropping of the Atomic Bomb is a very deep problem... Instead of commemorating Hiroshima we should celebrate... man's triumph over the problem [of transmutation], and not its first misuse by politicians and military authorities.
  - Frederick Soddy address to New Europe Group meeting on the third anniversary of the Hiroshima bomb. Quoted in New Europe Group, In Commemoration of Professor Frederick Soddy (1956), 6-7.

- They asked me what I thought of the atomic bomb. I said I had not been able to take any interest in it.
  - Gertrude Stein, "Reflection on the Atomic Bomb" (http://writing.upenn.edu/~afilreis/88/stein-atom-bomb.html) (1946).

- [The surplus of basic knowledge of the atomic nucleus was] largely used up [during the war with the atomic bomb as the dividend.] We must, without further delay restore this surplus in preparation for the important peacetime job for the nucleus - power production. ... Many of the proposed applications of atomic power - even for interplanetary rockets - seem to be within the realm of possibility provided the economic factor is ruled out completely, and the doubtful physical and chemical factors are weighted heavily on the optimistic side. ... The development of economic atomic power is not a simple extrapolation of knowledge gained during the bomb work. It is a new and difficult project to reach a satisfactory answer. Needless to say, it is vital that the atomic policy legislation now being considered by the congress recognizes the essential nature of this peacetime job, and that it not only permits but encourages the cooperative research-engineering effort of industrial, government and university laboratories for the task
  We must learn how to generate the still higher energy particles of the cosmic rays - up to 1,000,000,000 volts, for they will unlock new domains in the nucleus.
  - C. Guy Suits Addressing the American Institute of Electrical Engineering, in New York (24 Jan 1946). In *Schenectady Gazette* (25 Jan 1946)

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- Knowing he [Bob Serber] was going to the [first atom bomb] test, I asked him how he planned to deal with the danger of rattlesnakes. He said, 'I'll take along a bottle of whiskey.' … I ended by asking, 'What would you do about those possibilities [of what unknown phenomena might cause a nuclear explosion to propagate in the atmosphere]?' Bob replied, 'Take a second bottle of whiskey.'

- Edward Teller with Judith L. Shoolery, Memoirs: A Twentieth-Century Journey in Science and Politics (2001), 211.

- The fact is that nuclear weapons have prevented not only nuclear war but conventional war in Europe for forty years.
  - Margaret Thatcher, Speech at Lord mayor's Banquet 1986. Quoted in *One of Us:A Biography of Margaret Thatcher* by Hugo Young, Macmillan, 1989 (p. 480).

- The greatest man-made threat to U.S. survival is nuclear weapons. Russia already has the capacity to obliterate our civilization, and China soon could. As the number of nuclear powers increases, the prospects for preserving a stable deterrence regime diminishes. However, the U.S. only spent 1-2% of its defense budget on missile defenses during the period from 2003-2014, about $92 billion in then-year dollars. If the $1.7 trillion wasted on Iraq had instead been used to develop and deploy a comprehensive missile defense system, the U.S. today would be on the verge of being able to defeat all but the biggest nuclear attacks before warheads could reach the American homeland.
  - Loren Thompson , "Iraq Opportunity Costs: What America Could Have Had If It Never Invaded" (https://www.forbes.com/sites/lorenthompson/2014/06/27/iraq-opportunity-costs-what-america-could-have-had-if-it-never-invaded/#54c96dbd773a), *Forbes*, (Jun 27, 2014).

- Sixteen hours ago an American airplane dropped one bomb on Hiroshima, an important Japanese Army base. That bomb had more power than 20,000 tons of TNT....
  With this bomb we have now added a new and revolutionary increase in destruction to supplement the growing power of our armed forces...
  It is an atomic bomb. It is a harnessing of the basic power of the universe. The force from which the sun draws its power has been loosed against those who brought war to the Far East....
  Having found the bomb we have used it. We have used it against those who attacked us without warning at Pearl Harbor, against those who have starved and beaten and executed American prisoners of war, against those who have abandoned all pretense of obeying international laws of warfare. We have used it in order to shorten the agony of war, in order to save the lives of thousands and thousands of young Americans.
  We shall continue to use it until we completely destroy Japan's power to make war. Only a Japanese surrender will stop us.
  - Harry Truman, radio address to the American people, following the bombing of Hiroshima, Japan (August 6 1945).

- I am not sure it can ever be used... I don't think we ought to use this thing unless we absolutely have to. It is a terrible thing to order the use of something that is so terribly destructive, destructive beyond anything we have ever had. You have got to understand that this isn't a military weapon. It is used to wipe out women and children and unarmed people, and not for military uses. So we have got to treat this differently from rifles and cannon and ordinary things like that.
  - Harry Truman, as quoted in *Harry S. Truman: A Life* (https://books.google.com/books?id=7UXSMj3OF4oC&pg=PA344&lpg=PA344&dq=%22It+is+used+to+wipe+out+women+and+children+and+unarmed+people,+and+not+for+military+uses.+So+we+have+got+to+treat+this+differently+from+rifles+and+cannon+and+ordinary+things+like+that.%E2%80%9D&source=bl&ots=xoePU9q9JU&sig=Lxl_x7toU7Y3oD_zKKSZQ2zD29k&hl=en&sa=X&ved=0CCgQ6AEwA2oVChMIw7D1wb6dxwIVSjI-Ch3ibAd2#v=onepage&q=%22It%20is%20used%20to%20wipe%20out%20women%20and%20children%20and%20unarmed%20people%2C%20and%20not%20for%20military%20uses.%20So%20we%20have%20got%20to%20treat%20this%20differently%20from%20rifles%20and%20cannon%20and%20ordinary%20things%20like%20that.%E2%80%9D&f=false), by Robert H. Ferrell, p. 344

- The atom bomb was no "great decision." It was used in the war, and for your information, there were more people killed by fire bombs in Tokyo than dropping of the atomic bombs accounted for. It was merely another powerful weapon in the arsenal of righteousness. The dropping of the bombs stopped the war, save millions of lives.

- Harry Truman in reply to a question at a symposium, Columbia University, NYC (28 April 1959). In Truman Speaks (1960), 67.

- The single greatest problem the world has is nuclear armament, nuclear weapons, not global warming.
  - Donald Trump, first presidential debate, Transcript (https://www.washingtonpost.com/news/the-fix/wp/2016/09/26/the-first-trump-clinton-presidential-debate-transcript-annotated/#annotations:10505575), *Washington Post* (26 September 2016)

V

- With the end of the Second World War, the Soviet Union was now high on the list of tyrannical enemies of democracy, and American nuclear weapons development and strategic theory were fashioned with that enemy foremost in mind. Oppenheimer's sympathy for Communism, his enthusiasm for world government as the ultimate arbiter of nuclear technology, and his qualms about the proposed second generation of nuclear weapons, played a critical role in the history of the Cold War and in the precipitous course of his subsequent career. Already, in the fall of 1945, when Edward Teller was pressing for immediate development of the hydrogen bomb (the "Super," as it was called), Oppenheimer responded coldly and tersely: "I neither can nor will do so." Oppenheimer regarded the Super as a genocidal weapon: its only conceivable purpose would be the destruction of civilian populations by the millions — and ideally in the tens or hundreds of millions. The sole end of war with H-bombs would be annihilation. The peace that such a war would bring would be that of the mass grave; and if there were any survivors, they would likely prefer to have been among the dead. Civilization would have to be reconstituted from radioactive ash.
  And yet the undeniable perfidy of the Stalinist Soviet Union convinced even Oppenheimer that the Atomic Energy Commission (AEC), created to oversee the use of atoms for peace, would be above all the instrument of war. In 1947, Oppenheimer declared that the agency's main job was to "provide atomic weapons and good atomic weapons and many atomic weapons." And Oppenheimer wanted to be the moving force in this work, despite his ever-deepening moral qualms.
  But Oppenheimer was never of one mind for long. The Soviets' test of an atomic bomb in 1949 propelled him back to the internationalist position he had taken just after the war, believing that a single world organization should govern the nuclear policies of every individual nation. While Edward Teller insisted that the Super was needed now more than ever, Oppenheimer huffed, "Keep your shirt on." He joined Enrico Fermi and other eminent physicists in lobbying Roosevelt's former vice-president Henry Wallace to stop H-bomb development, "primarily because we should prefer defeat in war to victory obtained at the expense of the enormous human disaster that would be caused by its determined use." To possess a weapon of incalculable potency — some theoreticians feared it could ignite the atmosphere in an explosive chain reaction and destroy the earth — would pose graver dangers than not to have one at all.
  - Algis Valiunas, "The Agony of Atomic Genius" (https://www.thenewatlantis.com/publications/the-agony-of-atomic-genius), *The New Atlantis*, Number 14, Fall 2006, pp. 85-104.

- While Oppenheimer was making the case for tactical nuclear weapons, useful on the battlefield, the Strategic Air Command's war plan emphasized a massive and decisive nuclear first strike in the event of a conventional Soviet attack on Western Europe. According to Bird and Sherwin, the H-bomb advocates were so obsessed with the threat of Communism that they believed "Oppenheimer's championing of tactical nuclear weapons was a ploy to block the Super Bomb." Teller went so far as to spread the word that in trying to block the H-bomb Oppenheimer was acting on "direct orders from Moscow." Teller may have been out of control, the Strategic Air Command may have been defending its turf, and Strauss may have been seeking personal revenge against Oppenheimer, but all the same, the gravest matters were at stake. The Soviet Union was a real threat that needed to be confronted with sobriety; seeing the defenders of the H-bomb as fanatics and conspiracy theorists foolishly belittles the existential challenge America was then just beginning to face.
  - Algis Valiunas, "The Agony of Atomic Genius" (https://www.thenewatlantis.com/publications/the-agony-of-atomic-genius), *The New Atlantis*, Number 14, Fall 2006, pp. 85-104.

- Machiavelli, so widely considered the founding father of modern political morality, or immorality, understood prudence, or the ability to choose among possible courses of action, as the sine qua non of the conqueror. But in the atomic age, the foremost aim of prudence among more or less decent nations is no longer to conquer but to avoid annihilation, while also avoiding the evil of annihilating the enemy — i.e., nuclear genocide. In October 1949, the General Advisory Committee to the AEC recommended that “a super bomb should never be produced” — that it “might become a weapon of genocide.” Oppenheimer was one of the signatories. To assume that the Soviet enemy would share this American scrupulousness was the committee’s fallacy; and to make such an assumption of Stalin was the depth of folly.
    - Algis Valiunas, "The Agony of Atomic Genius" (https://www.thenewatlantis.com/publications/the-agony-of-atomic-genius), *The New Atlantis*, Number 14, Fall 2006, pp. 85-104.

W

- The only use for an atomic bomb is to keep somebody else from using one. It can give us no protection—only the doubtful satisfaction of retaliation...

  Nuclear weapons offer us nothing but a balance of terror, and a balance of terror is still terror.

    - George Wald, from speech given at an anti-war teach-in at the Massachusetts Institute of Technology, (4 Mar 1969) 'A Generation in Search of a Future', as edited by Ron Dorfman for Chicago Journalism Review, (May 1969).

- I used to worry about the fact that [General Power] had control over so many weapons and weapon systems and could, under certain conditions, launch the force. Back in the days before we had real positive control [i.e., PAL locks], SAC had the power to do a lot of things, and it was in his hands, and he knew it.
    - Horace M. Wade, qtd. in Peter D. Feaver: *Armed Servants: Agency, Oversight, and Civil-Military Relations*. Harvard University Press, Cambridge 2005, ISBN 978-0-674-01761-0, S. 151.

- The only absolute defence against nuclear weapons is to do away with them.
    - Francis Wheen, "Dr. Stranglove, I Presume", *The Guardian*, 12th April 2000.

- When A. J. P. Taylor, having described with lurid relish the effect of a nuclear explosion, asked "Is there anyone here who would want to do this to another human being?" there was a complete hush until he yelled, to thunderous applause, "*Then why are we making the damned things?*"
    - David Widgery, on Taylor's speech at a February 1958 CND meeting. In "Don't You Hear the H-Bomb's Thunder?" in David Widgery, *The Left in Britain*, 1976, (p.101).

- **Nuclear weapons are a symptom of conflict, fear, insecurity, and a drive to dominate.** Denuclearization will follow more naturally and easily with decreased tensions and improved relationships. Sanctions are a form of economic warfare with a high rate of failure. Punitive, coercive policies do not always achieve the best outcomes. Sanctions harm innocent people, escalate conflicts and can put us on a path to war. They can provoke targeted populations to rally round the flag, support hardliners and inflame resentment against America. We can achieve superior outcomes with clear-eyed respect and steps towards thawing the ice.
    - Marianne Williamson in Candidates Answer CFR's QuestionsMarianne Williamso*Council on Foreign Relations* (https://www.cfr.org/article/marianne-williamson), August 16, 2019

Y

- Despite nuclear abolition being the long-awaited wish of all A-Bomb survivors, there are still more than 13,000 nuclear weapons in the world, with nuclear states continuing to modernize their nuclear forces. Moreover, nuclear disarmament continues to stagnate, further exacerbating global tensions.
    - Hidehiko Yuzaki as quoted by Gayle Spinazze in "Press Release—THIS IS YOUR COVID-19 WAKE-UP CALL: IT IS 100 SECONDS TO MIDNIGHT" (https://thebulletin.org/2021/01/press-release-this-is-your-covid-19-wake-up-call-it-is-100-seconds-to-midnight/), (January 27, 2021)

Despite nuclear abolition being the long-awaited wish of all A-Bomb survivors, there are still more than 13,000 nuclear weapons in the world, with nuclear states continuing to modernize their nuclear forces. ~ Hidehiko Yuzaki

Zeeya Merali, "Did China's Nuclear Tests Kill Thousands and Doom Future Generations?" (https://www.scientificamerican.com/article/did-chinas-nuclear-tests/), *Scientific American*, (July 1, 2009).

- Enver Tohti remembers the week that it rained dust. That summer of 1973 he was in elementary school in Xinjiang Province, China's westernmost region, which is inhabited mostly by Uygurs, one of the country's minority ethnic groups. "There were three days that earth fell from the sky, without wind or any sort of storm. The sky was deadly silent—no sun, no moon," he recalls. When the kids asked what was happening, the teacher told them that there was a storm on Saturn (its Chinese name translates into "soil planet"). Tohti believed her. It was only years later that he realized it was radioactive dust raised by the test detonation of a nuclear bomb within the province.
- A few hundred thousand people may have died as a result of radiation from at least 40 nuclear explosions carried out between 1964 and 1996 at the Lop Nur site in Xinjiang, which lies on the Silk Road. Almost 20 million people reside in Xinjiang, and Tohti believes that they offer unique insight into the long-term impact of radiation, including the relatively little studied genetic effects that may be handed down over generations.
- The figures came as little surprise to Tohti. Ironically, as a teenager, he was proud that his province was chosen for tests marking China's technological and military progress. His view changed when he became a physician and saw a disproportionate number of malignant lymphomas, lung cancers, leukemia cases, degenerative disorders and babies born with deformities. "Many doctors suspected this was connected to the tests, but we couldn't say anything," Tohti recalls. "We were warned away from researching by our superiors."
- The Lop Nur project is just the tip of an international iceberg, remarks Abel Gonzalez of the Argentine Nuclear Regulatory Authority in Buenos Aires. Radiation researchers have had easy access to only three sites where nuclear blasts occurred—the U.S.'s site Bikini Atoll, the Soviet Union's Semipalatinsk site in Kazakhstan and France's site in Polynesia—and these areas represent just a small fraction of the approximately 500 atmospheric tests the world has seen. "We have a moral responsibility to investigate all nuclear test sites," Gonzalez says. Certainly for the Xinjiang people affected by the Lop Nur tests, truer words have never been spoken.
- Does repeated exposure to radiation affect germ-line cells such that the same mutations get passed on, generation after generation? That is one question the Lop Nur project hopes to answer. The other two major instances of a large population exposure to radiation—the atomic bombs dropped over Hiroshima and Nagasaki—have produced no generational effects in survivors, points out Roy Shore, chief of research at the Radiation Effects Research Foundation in Hiroshima. But he adds that the exposure patterns vary. "The atomic bomb was an almost instantaneous exposure," Shore explains. "We still need good data on radiation that has been delivered time and time again, over a long period—there may be different effects."

In fiction

- **Snake**: Do they really have the ability to launch a nuclear missile?

  Campbell: They say they do. They even gave us the serial number of the warhead they plan to use.
  Snake: Was the number confirmed?
  Campbell: I'm afraid so. At the very least, they've got their hands on a real nuclear warhead.
  Snake: Isn't there some kind of safety device to prevent this kind of terrorism?
  Campbell: Yes. Every missile and warhead in our arsenal is equipped with a PAL, which uses a discreet detonation code.
  Snake: PAL?
  Campbell: Permissive Action Link. A safety control system built into all nuclear weapons systems. But even so, we can't rest easy.
  Snake: Why not?
  Campbell: Because the DARPA Chief knows the detonation code.
  Snake: But even if they have a nuclear warhead, it must've been removed from its missile. All the missiles on these disposal sites are supposed to be dismantled. It's not that easy to get your hands on an ICBM (intercontinental ballistic missle).
  Campbell: That used to be true, but since the end of the Cold War you can get anything if you have enough money and the right connections.

Colonel Campbell: [S]ince the end of the Cold War you can get anything if you have enough money and the right connections. ~ Hideo Kojima and Tomokazu Fukushima

  - Hideo Kojima and Tomokazu Fukushima, *Metal Gear Solid*. (1998).

See also

- Anti-war movement
- Arms control
- Atomic bombings of Hiroshima and Nagasaki
- Corruption
- Crimes against humanity
- Cruelty
- Greed
- Insanity
- Military Industrial Complex
- NATO
- Nuclear war
- *War is a Racket* by Major General Smedley D. Butler
- Tyranny

- War crimes

External links

- Anti-nuclear movement
- Arms control
- Broken-backed war theory
- Doomsday Clock
- Food not bombs
- Global catastrophic risk
- List of states with nuclear weapons
- Nuclear arms race
- Nuclear holocaust
- Nuclear weapons debate
- Nuclear winter

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